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ANALYSIS OF TRAINING REQUIREMENTS IN THE LANDING FORCE TRAINING COMMANDS (NSAP PROJECT PHIB-6-73)

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A study was conducted to develop recommendations for the improvement of training methods, equipment, and facilities at the Landing Force Training Commands (LFTCs), Atlantic and Pacific. Information was obtained through review of relevant documentation, interviews and conferences, and on-site visits to both LFTCs. Major conclusions of the study are that: (1) implementation of the systems approach to course design would be a major step in the improvement of LFTC course design methods, (2) greater use of mediated presentations may

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increase the efficiency of Mobile Training Teams, (3) computer system simulation technology could be employed to provide training for users of the new automated support systems currently being implemented in the amphibious community. Appropriate recommendations are provided.

FOREWORD

This study was conducted as a part of the Navy Science Assistance Program (NSAP), a program sponsored by the Director of Navy Laboratories. The project was initiated on 22 January 1973 in response to a request from the Commanding General, Landing Force Training Command, Atlantic, and was conducted jointly by the Navy Personnel Research and Development Center (NPRDC), San Diego, California, and the Naval Training Equipment Center (NTEC), Orlando, Florida.

The assistance of Colonel P. A. Cauchon, USMC and Major A. J. Trent, USMC of LFTCLANT, and Major E. F. Whipple, USMC of Landing Force Training Command, Pacific is especially appreciated. The willing cooperation of all personnel contacted at both LFTCs is gratefully acknowledged.

J. J. Clarkin
Commanding Officer

SUMMARY

Problem

The Landing Force Training Commands, Atlantic and Pacific (LFTCLANT and LFTCPAC) are facing a number of problems: (1) their facilities and equipment are obsolescent, (2) changing student aptitudes and attitudes require alternative approaches to instruction, and (3) the introduction of automated data processing and support systems within the amphibious fleet has created requirements for new types of training.

Objectives

The objectives of this study were: (1) to identify, evaluate, and refine the most promising recommendations of three previous studies of LFTCLANT training problems, (2) to assess the applicability of these recommendations to LFTCPAC, and (3) to develop more specific recommendations for improving training methods and facilities at both LFTCLANT and LFTCPAC.

Approach

This project was a study task. Information was obtained through review of relevant documentation, interview and conferences, and on-site visits. The recommendations in this report are based on the expert judgment of the assigned research personnel.

Results

Many recommendations contained in the previous LFTC studies are valid and applicable to both LFTCs. The LFTCs can improve their training through full implementation of MCO P1510.23A, supplemental instructor training, procurement of additional training equipment and systems, and renovation of existing classroom facilities.

Recommendations

1. A systematic program to implement the recommendations contained in this report should be initiated.

2. The systems approach to course design should be fully implemented by both LFTCs. Additional support, including supplemental instructor training, improved equipment, and refurbished classrooms should be provided.

3. Modification of Mobile Training Team courses should be considered to take advantage of alternative presentation formats.

4. Funding should be requested for MEDS and ASIS simulator development.

5. An in-depth study should be conducted to assess the feasibility of developing an Amphibious Force Command and Control Simulator.

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ANALYSIS OF TRAINING REQUIREMENTS IN THE LANDING FORCE TRAINING COMMANDS

INTRODUCTION

Purpose

This report provides recommendations for the improvement of training equipment, facilities, and methods at the Landing Force Training Commands, Atlantic and Pacific (LFTCLANT and LFTCPAC). Selected general recommendations from previous training studies conducted for LFTCLANT were reviewed and their applicability to LFTCPAC requirements was assessed. Specific recommendations contained in this report were developed through analysis of current and projected LFTC training requirements and problems. It is expected that these recommendations will be used as the basis for an evolutionary program of training improvement at both LFTCs.

Background

The Landing Force Training Commands (LFTCs) were established to fulfill a requirement contained in DOD Directive 5100.1 which states, in part, that the Navy is "responsible for the amphibious training of all forces assigned to joint amphibious operations in accordance with doctrines established by the Joint Chiefs of Staff." LFTCLANT, located at Little Creek, Virginia, is a subordinate command of Commander Naval Surface Force, Atlantic Fleet. LFTCPAC, located at Coronado, California, is a subordinate command of Commander Naval Surface Force, Pacific Fleet. Each FLTC, although performing a Navy training function, is commanded by a Marine Corps Brigadier General and is comprised of Army, Navy, and Marine Corps personnel. The primary mission of the LFTCs is to train landing force personnel of all services in the doctrine, tactics, and techniques of amphibious operations. Training is conducted for both regular and reserve components of United States Armed Forces and for military personnel of Allied Nations either at LFTC training facilities or in Mobile Training Teams (MTTs) at remote locations.

This project was initiated on 22 January 1973 by the Director of Navy Laboratories in response to a request by the Commanding General LFTCLANT. Project objectives were (1) to identify, evaluate, and refine the most promising of a number of recommendations contained in three previous studies of LFTCLANT training problems, (2) to assess the applicability of those general recommendations to LFTCPAC, and (3) to develop more specific recommendations for the improvement of training methods, equipment, and facilities at both LFTCLANT and LFTCPAC.

Under the sponsorship of the Navy Science Assistance Program (NSAP), the project was assigned to the Navy Personnel Research and Development Center (NPRDC) and the Naval Training Equipment Center (NTEC). NPRDC was designated as lead laboratory. Although both organizations participated in all aspects of the project, subtask responsibilities were divided, to some extent, on the basis of areas of specialization within the two organizations. NPRDC concentrated on training methods, classroom configuration, and instructional media, while efforts by NTEC were directed toward the identification and documentation of training system requirements, particularly simulators, and related complex training devices.

Approach

This project was conducted as a study task. Information was obtained through review of relevant documentation, interviews and conferences with cognizant personnel, and appropriate on-site visits. Recommendations contained in this report are based on the expert judgment of assigned research personnel.

A program to review and evaluate training procedures at LFTCLANT was conducted during the period from December 1971 to November 1972. Conclusions and recommendations stemming from this study were published in a series of reports, summarized in a final multivolume document entitled *Curriculum, Instructional Facilities, and Educational Methodology*, by COL. J. C. Schabacker, USMC, (1972). This report served as a primary reference for the current study, and was reviewed for identification of the most promising recommendations. A list of major topics covered by the Schabacker report, together with a brief discussion of related recommendations, is included in Appendix A.

Relevant problems addressed in the Schabacker report and problems identified through discussions with cognizant LFTC personnel were classified into four topic categories: (1) implications of the All-Volunteer Force for landing force training, (2) instructional methods for the LFTCs, (3) training facilities and equipment, and (4) amphibious force automation and its implications for landing force training. The body of this report contains a discussion of each of the above topics together with the recommendations of project research personnel.

IMPLICATIONS OF THE ALL-VOLUNTEER FORCE

Many studies have been conducted recently in an attempt to predict the impact of terminating the draft and relying on volunteers to fill the ranks of the armed services. Most of the studies available for review are oriented primarily toward predicting the number of available volunteers. The Schabacker report, however, provides an interesting and logical discussion of the possible impact of the All-Volunteer Force upon student quality. Although the report addressed LFTCLANT problems, conclusions of the section on the all-volunteer force seem to be equally applicable to LFTCPAC.

Predictions

Schabacker (1972) states that the general educational level for enlisted military personnel is dropping. This assertion is consistent with previous postwar experience and information presented in the report, *Navy and Marine Corps Military Personnel Statistics (NAVPERS 15658, June 1973).* Experience at both LFTCs indicates that basic reading and arithmetic skill levels of students are slightly lower than those in the recent past. If this trend continues, it is anticipated that the learning abilities of future LFTC students will be somewhat lower than those of the draft-motivated personnel of the Vietnam era. This eventuality dictates modification of LFTC training methods in order to maintain the quality of graduates.

In addition to decrement in trainee learning ability, it has been predicted that the armed services can expect to feel the impact of cultural change within its training institutions. The Westinghouse Center for Advanced Studies and Analyses (1972) predicted that young people of the future will display individualism, restlessness under discipline, and resistance to practices, authorities, and values simply handed down from the past. Increased demands for true justice, freedom, and equality are anticipated. Concern for the development of individual potential and a desire for more alternatives in both life style and career options are foreseen. It is also predicted that training will have to be modified to accommodate trainees inclined to question and analyze critically. Training will need to be more realistic, imaginative and mission oriented, with increased emphasis placed on leadership skills—the handling and controlling of people.

Discussion and Recommendations

Two problems must be addressed in planning future landing force training for an all-volunteer force. The first relates to possible lower aptitude and learning ability of future LFTC students, a problem compounded by increasing requirements for technical capability and understanding. Schabacker (1972) states that "since 1941, the military requirement for technical and scientific skills has more than doubled, while the requirement for exclusively military skills has declined by two thirds."

The second problem area involves the impact of cultural changes on trainee attitudes and ultimately on training programs themselves. It appears that the Marine Corps, in general, is reacting in a positive manner to face both the aptitudinal and cultural challenges of the present and future. A remedial reading program recently instituted at the Marine Corps Recruit Depot, San Diego, has shown considerable promise in bringing recruits with reading problems up to at least marginally acceptable reading levels. Human relations programs have been established throughout the Marine Corps to address the problems related to cultural change.

Current efforts at the LFTCs to improve general training methods should also enhance the training of lower aptitude personnel. LFTCLANT has made considerable progress in using programmed instruction to provide materials for personnel of varying aptitudes and capabilities. Additionally, based on informal recommendations provided by NPRDC, LFTCLANT is conducting preliminary tests of individualized audiovisual presentations for instructing poor readers. Both LFTCs are currently implementing Marine Corps Order (MCO) 1510.23A, *Design of Courses of Instruction,* which provides a systems approach to course design, to develop courses which are more relevant to student needs and job performance requirements.

Research at NPRDC has shown that many methods for improving training to meet the requirements of lower aptitude personnel also are effective in making training more efficient and interesting for higher aptitude students. The recommendations listed below were developed for the training of Armed Forces Qualification Test (AFQT) Mental Group IV personnel (Hooprich, 1973), but are considered to be generally applicable to all enlisted training and some officer training courses at both LFTCs.

1. Content of training courses for Group IVs should be performance-oriented and should be based on job-relevant learning objectives.

2. Training of Group IV personnel generally will be most effective if individualized, selfpaced, self-study learning methods and materials are utilized. Many of the research findings in regard to the training achievement and motivation of Group IVs suggest that this approach is the most productive. Furthermore, truly individualized training reduces motivational problems experienced by Group IV personnel when they rank near the bottom of classes that contain both IVs and non-IVs and are taught by conventional, lock-step methods.

3. Training materials, particularly self-study materials, that are fully adequate for the particular learning needs and interests of Group IVs typically are not available "off-the-shelf", and must be specially developed.

4. Content of training programs for Group IV personnel should minimize reliance on theoretical knowledge, stress practice of actual job skills, and extensively incorporate simplified terminology and pictorial materials.

5. Whenever appropriate, audio and audiovisual training materials should be integrated with the actual practice of job performance skills.

6. Remedial training programs should not be explicitly identified as such and, insofar as possible, should be incorporated into the teaching of specific applied skills. Group IVs should be given special training in "how to learn."

7. The learning situation should be well structured. Specifically, requirements and goals should be stated clearly, instructions and directions should be as explicit as possible, and interrelationships among aspects of the course content should be pointed out. Additionally, evaluation of student achievement against stated standards usually should be performed by the instructor rather than by the Group IV trainees themselves.

8. Motivation of Group IVs in a training situation should be enhanced by stressing the practical value and applications of the course content, emphasizing individual improvement rather than relative class standing, and providing frequent feedback concerning progress. Whenever feasible, learning games and group competition should be employed.

9. Training large numbers of Group IV personnel will require additional facilities and personnel to provide student counseling.

10. The Navy training system must be flexible enough to adjust for the moderate to substantial increases in training time typically required to bring Group IV trainees to acceptable levels of performance.

Additionally, full implementation of the systems approach to course design as described in MCO 1510.23A is recommended as a major step toward development of the most effective course materials for personnel of widely varying aptitude levels.

INSTRUCTIONAL METHODS

Previous LFTCLANT studies addressed the topic of instructional methods in varying ways. Most extensive coverage was provided in Commander, Training Command, U.S. Atlantic Fleet, COMTRALANT letter FF8-401A rr 1500 (Ser # 718), of 15 June, 1972. Course design recommendations listed in this letter are discussed below. Also included in the following section is a summary of MCO 1510.23A and recommendations for implementation of systematic course design methods.

Course Design

Previous Recommendations

In connection with course design recommendations, the COMTRALANT letter states that "behavioral objectives" should be prepared for each course and for each lesson within a course. It is further suggested that the body of all lessons should contain "questions to stimulate interest" and allow assessment of student progress by the instructor. Student notebooks should be prepared for each class which would contain all handouts required for the course plus a detailed course outline to aid in student note taking and study. Implementation of an objective method for selecting instructors to be trained as programmed instruction writers was also recommended. Finally, the following statement was made:

> It is generally accepted that the results of instruction and training can be improved by judicious selection and application of innovational methods and media. The experience of military and industrial training activities, however, has generally shown that innovational type methods and media should be carefully selected and expertly applied, with respect to the course objectives and the type and level of students, if the results of training are to be significantly improved. The importance of careful planning selection and training of personnel, selection of methods and media, establishment of realistic milestones, quality control procedures, and proper evaluative criteria and procedures must be emphasized.

These recommendations and the supporting statement are endorsed by NPRDC. However, one limitation was noted: At the time the COMTRALANT report was prepared, there were no officially recognized guidelines available to the LFTCs for the systematic design and preparation of training courses. Thus, while these recommendations reflect the influence of "systems techniques," they are not complete.

Review of a Systems Approach to Course Design

Subsequent to completion of the last of the major LFTCLANT studies, Marine Corps Order (MCO) P1510.23A was published to implement a "systems approach" to the design of "all formally structured instruction conducted by Marine Corps commands." The order, entitled *Design of Courses of Instruction*, provides an organized guide for analyzing training requirements, outlining of course content, and selecting of materials for course presentation. Topics addressed in the order are summarized below.

1. <u>Analysis of Performance Requirements.</u> This section delineates a systematic method for the collection of job data and identification of specific tasks and related performance requirements of jobs or billets. Sample forms are provided to aid in data collection and analysis. Application of the techniques in this section to a specific job or billet will result in a list of Performance Objectives, defined as "statements of required job performance expressed in behavioral terms."

2. <u>Selection of Applicable Performance Objectives.</u> Performance requirements analysis identifies the knowledge, skills, and attitudes required for performance in a particular job. It is impractical to attempt to train all military personnel to a level of full job proficiency in a formal school situation. Thus the specific knowledge, skills, and attitudes to be learned in a given course of instruction must be identified and delineated. The factors listed below are provided as an aid in selection of those job elements to be included in formal training.

Universality

Criticality

Difficulty

Frequency

Practicability

Achievability

Deficiency

Retainability

Follow-on Training

3. <u>Preparation of Learning Objectives.</u> MCO P1510.23A defines a learning objective as:

> A statement of performance required of a student, expressed in behavioral terms. Differs from performance objective only in the context or environment in which it is applied. Learning objectives normally derive from performance requirements which have been expressed in terms of behaviorally stated performance objectives.

Two categories of learning objectives–terminal and enabling–were identified, and three major categories of statements to be included in learning objectives were outlined. These are statements of (1) the behavior to be learned, (2) the conditions under which the behavior must be demonstrated, and (3) the level of proficiency required. Additionally, the development of objectives based on level of learning was discussed. The levels addressed are knowledge/mental skills, manual skills, and attitudes.

4. <u>Preparation of Criterion Measurements.</u> This section discusses the development and use of criteria in general terms. Readers are referred to the Marine Corps Instructor's Guide, to be published, which will contain instructions for the development of these measures.

5. Selection and Sequencing of Instructional Content. This section provides a brief discussion of the selection and sequencing of course content. Selection of appropriate topics and materials to be presented is primarily based on previously determined learning objectives and the subject matter expertise of instructors. Sequencing again relies primarily on the skills of the course designer.

6. Selection of Instructional Strategies. Instructional strategies are defined as "a combination of teaching methods, mediating devices, instruction and administrative procedures required to most effectively present a period or block of instruction." Various methods of instruction that utilize available media are identified, and 14 different instructional methods are listed and described with regard to advantages and disadvantages. Also provided is a table clearly depicting the advantages and disadvantages of alternative methods. Many mediating devices or training support equipments to aid in presenting and conducting a course are discussed. The characteristic advantages, disadvantages, and applications of 16 classes of mediating devices are outlined.

7. Preparation of Instructional Material and Conduct of Instruction. This section provides a discussion of Marine Corps requirements for formalized course documentation.

8. Evaluation of Instructor and Student. A brief discussion of evaluation is provided.

9. Validation. This section discusses feedback procedures in a cursory manner.

Discussion

Instructional requirements at the LFTCs were carefully examined during the course of this study. Problems of varying student aptitudes together with increasing technical complexity of job tasks, have emphasized the need for more integrated and systematic course design efforts. Marine Corps Order 1510.23A provides one method for systematic design of training courses. This research team concludes that the order is directly applicable to the course design requirements of the LFTCs and that its full implementation will be a major step toward the improvement of LFTC training methods.

It should be noted that LFTCPAC has recently conducted a pilot application of portions of the order with a moderate degree of success. Full implementation, however, will require orientation of instructor personnel and acquisition of additional capabilities in the area of mediating equipment. Specific recommendations for acquisition of equipment and facilities are provided in the next section. Additional specialized support may be required.

Establishment of a civilian Educational Specialist billet at each LFTC should be considered to provide more background and continuity in the areas of course design and media application. The specialist's activities would take the form of consultation and collaboration with instructors during course design or review efforts. Such an individual could provide direct assistance in course design efforts, perform research tasks, and act to keep the LFTCs current with changes and innovation in the field of instructional technology. A recommended job description is provided in Appendix B.

Presentation of Instruction

Marine Corps Order P1510.23A provides the following statement concerning the choice of methods for presentation of instruction:

> Successful instruction is not dependent upon the use of any particular method. As a general rule, methods which provide for adaptation to individual differences, encourage student initiative, and stimulate individual/group participation are preferable to those which do not.

This statement effectively summarizes the position of NPRDC with regard to the presentation of instruction at both LFTCs. Because of differences in individual course content, no one method can be recommended to cover all courses of instruction. Each course must be analyzed separately, and its design based on actual job performance requirements.

Recommendations pertaining to specific presentation problems within the LFTCs are addressed throughout this report. One problem not covered elsewhere, however, is related to training provided by the LFTCs at remote locations. A major LFTC function is to provide Mobile Training Teams (MTTs) to instruct United States and Allied Armed Forces personnel in the conduct of amphibious operations.

Use of MTTs allows a small number of instructors to provide instruction for a far greater number of students than would normally be practical in a conventional school situation. Nevertheless, the conduct of courses by Mobile Training Teams requires a major commitment of instructor resources by the LFTCs and TAD funds by using commands in order to provide the necessary depth of knowledge and specialized experience.

Courses currently taught by MTTs cover a variety of specialized topics. The instructors assigned to MTTs are selected on the basis of their professional background and capability to provide in-depth knowledge of each training topic. Because of the requirement for in-depth coverage of diverse subjects within individual courses, the number of instructors normally included in an MTT is much greater than would initially appear to be warranted.

A review of selected MTT curricula indicated that it may be possible to present many MTT topics in alternative formats such as written programmed instruction or various forms of audiovisual presentation. Prior to implementing such an approach, however, a number of questions must be considered concerning the applicability of these formats to MTT requirements. Thus, on the basis of recommendations provided by NPRDC, a separate project has been initiated to redesign an existing MTT course at LFTCPAC to incorporate applicable alternative instructional methods. Additionally, this project will:

1. Assess the feasibility of utilizing recorded or programmed materials for presentation of portions of course content,

2. Determine the most appropriate media and format for such presentations,

3. Determine the most appropriate method for preparation of course materials.

4. Evaluate the effectiveness of the redesigned course relative to the original course both in terms of cost and student learning.

Funding for this MTT project is being provided by the Director of Navy Laboratories through the Navy Science Assistance Program (NSAP).

Instructor Orientation

Introduction of new methods to accomplish job tasks can be a problem in any organization. In a training organization, new methods can sometimes be viewed as a threat, especially if imposed by sudden mandate without adequate advance orientation and information. Orientation of present LFTC instructor personnel to the system approach to course design should ideally be accomplished in the following four steps:

1. Inform instructors of the intention to implement Marine Corps Order P1510.23A.

2. Conduct a familiarization program. The Instructor Training School at Quantico, Virginia, is preparing sound/slide packages which address various aspects of the order. The initial package on "Developing Learning Objectives" is a well done, professional quality presentation and is recommended for use by the LFTCs. If future programs are of similar quality, they will be a major instructor training resource.

3. Conduct pilot applications of Marine Corps Order P1510.23A permitting participation by LFTC instructors in the design or redesign of a course on a group basis. Group leaders should be selected on the basis of previous experience with the order or in the application of the systems approach in some other context.

4. Actual implementation should be accomplished progressively with new courses being developed as required, followed by redesign of existing courses.

Orientation to the systems approach should be included as an integral part of the overall LFTC instructor training program. The Schabacker report indicated that most LFTC instructors are trained at Navy Schools. Supplemental instruction, using materials provided by the Instructor Training School at Quantico, Virginia, should be provided to graduates of Navy instructor training schools. Additionally, at least one instructor from each LFTC should attend the Instructor Training School at Quantico, Virginia each quarter.

TRAINING FACILITIES AND EQUIPMENT

Training can be accomplished in almost any environment given high enough levels of instructor and student motivation. However, modern classrooms designed with consideration for environmental control, use of mediated instructional methods, and some degree of student and instructor comfort can contribute immensely to the motivation and alertness of both instructors and students. During the Vietnam era, funds for maintenance and modernization of military educational facilities did not keep pace with training needs. The LFTCs, like many other military training institutions, need to refurbish, repair, and (to some extent) re-equip their classroom facilities. This report section discusses the subject of classroom and auditorium facilities together with equipment requirements for existing facilities.

The Schabacker report addresses, in part, the topic of physical facilities. A list of recommended improvement projects was prepared, some of which have been completed. Many projects considered mandatory for a satisfactory learning environment have yet to be started. Improvements applicable to both LFTCs which are supported by NPRDC are listed below. Justifications are provided based on examination of existing facilities and evaluation of relevant methodological requirements.

Training Facilities

Acoustical Engineering

Acoustical qualities of the classrooms at both LFTCs are poor. Echoes are very prominent and cause considerable student distraction. This condition might be improved by installing sound absorbing ceilings and wall coverings. Students in the rear of many classrooms at both LFTCs have considerable difficulty understanding the lecturer. Some type of public address system should be considered for these facilities. An acoustical engineering study should be initiated to determine specific requirements for sound and noise control together with methods for effective transmission of audio information within each classroom at both LFTCs.

Ventilation and Temperature Control

Winter classroom ventilation and temperature control at both LFTCs appear adequate. Summer ventilation and temperature control capabilities at LFTCPAC are being improved, while those at LFTCLANT are completely inadequate. Information provided by the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) indicates that classroom temperature levels of approximately 70° Effective Temperature (ET) are required for a suitable learning environment. *The ASHRAE Guide and Data Book, "Applications, 1971"* states that a system capable of providing such an environment would perform the following functions: (1) control of temperature within prescribed limits, (2) dilution of odors to an acceptable threshold, (3) removal of dust, pollen, and other airborne particles, (4) control of harmful bacteria, (5) maintenance of acceptable air motion and a uniform air pattern, (6) maintenance of relative humidity within acceptable comfort standards (p. 52).

A military construction project is underway at LFTCPAC to provide suitable ventilation for Staff Planning School facilities. This project will not provide a capability for cooling of outside air being drawn into the classroom, but will simply create "air motion and a uniform air pattern." Considering the temperature climatic conditions at Coronado, such a system may prove satisfactory. However, the ASHRAE publication (p. 53) specifically states that "even under the most favorable conditions, ventilation systems cannot maintain comfort when the outside air temperature exceeds 70°F." Thus, it is recommended that, upon completion of the ventilation project, LFTCPAC request careful assessment of system performance by local Public Works Center representatives to ensure that it meets the previously described standards. Local regulations concerning the use of air conditioning should, of course, be considered.

The situation at LFTCLANT differs considerably. The only provision for ventilation in most of the classrooms are window openings and pedestal fans. Two 250-man capacity auditoriums have only four doors and pedestal fans. During hot, humid summer days typical of the Norfolk area, effective temperature levels in the LFTCLANT auditorium and classrooms often reach levels well above those recommended for such facilities. Although two classrooms have been equipped with surplus air conditioning units, the units have outlived their life expectancy and cannot be used during class periods because of noise. A military construction project (No. P-609) to air condition the buildings shared by LFTCLANT and the Naval Amphibious School has been submitted and is currently carried as unfunded by the Secretary of the Navy. It is mandatory that this project be funded as soon as possible to alleviate the completely unsatisfactory environmental conditions that exist at LFTCLANT during the summer months.

Illumination

Classrooms at both LFTCs were originally built with marginal lighting and illumination control capabilities. Light sources provide sufficient levels of illumination but cannot be dimmed when required. Some classrooms at both LFTCs have excessive glare that contributes to student fatigue. Finally, in some classrooms, instructors must leave the platform in order to operate light controls. A careful study of classroom illumination at both LFTCs should be conducted by illumination engineers. It should be noted that minor modification of some classroom lighting at LFTCLANT is presently underway; therefore, any study should await completion of current in-house projects.

Furnishings and Equipment

Classroom Furniture

Most of the classroom furniture at both LFTCs is unsatisfactory for use in a formal school situation. It is recommended that all existing classroom furnishings be replaced with modern units designed to contribute to the total learning environment. Specific manufacturers are best selected on the basis of local application, availability, and individual requirements.

Blackout Curtains

Facilities for darkening the classrooms at both LFTCs are marginal. The problem at LFTCLANT is especially acute. Curtains used in the past deteriorated rapidly, and funds for purchase of new curtains of more durable material have not been provided. It is recommended that an effective, easy to operate, room darkening capability be provided for both LFTCs. Such a capability should include curtains of a durable material such as fiberglass, nylon, aluminum, or plastic together with a mechanism for closing the curtains by remote control from the classroom lectern. A professional presentation should not be disrupted by the fumbling frequently involved in darkening a classroom or by the high ambient light levels which currently render projected visual materials dim and difficult to see. The recommended curtains may also be designed to aid in sound control.

Carpeting

Instructors at both LFTCs are often required to spend a considerable number of hours each day standing on floors of hard material such as asphalt tile, which can cause considerable foot and leg discomfort after a time. It is recommended that instructor locations at both LFTCs be carpeted to reduce instructor fatigue and to act as a sound dampening material.

Podiums

A number of training devices and systems have been considered for use in classrooms at both LFTCs. The operation of such systems can be disruptive if controls are not conveniently accessible to the instructor. The most effective control method involves integration of appropriate audiovisual controls into an instructor podium for each classroom. It is suggested that such podiums be designed and constructed as Public Works projects. Should this approach be accepted, NTEC should be contacted to provide appropriate consultation in outlining functional requirements.

Individual Study Facilities

Instruction provided at both LFTCs requires that students possess at least minimum arithmetic and reading skills. Conclusions presented previously indicated that some students arriving at the LFTCs in the future may have arithmetic and reading deficiencies which could preclude effective student participation in assigned courses.

Both LFTCs conduct remedial arithmetic programs as a part of certain courses such as embarkation. Currently, there is no effective remedial reading program. Remedial instruction during class periods would be a very ineffective use of course time, since students who do not need training tend to become demotivated, and those who need it most do not get enough. The most effective solution is to provide individualized study materials for administration during off-duty hours. Such materials should be presented in audiovisual form to stimulate interest and to circumvent reading problems. Individual study facilities should be provided at the LFTCs to permit student access to an effective learning situation. Such facilities should be located in a classroom or similar space and should include fully equipped learning carrels.

NTEC has procured a number of learning carrels for use at the Naval Training Center, Great Lakes. These four-student carrels are fully equipped for individualized presentation of instructional materials. Because large quantities were acquired, unit costs were substantially lower (approximately $100 per student position) than for the same equipment purchased individually. Representatives of NTEC have informally indicated that it may be possible for the LFTCs to purchase additional units. A description of the carrels and detailed specifications of the individual components are provided in Appendix C. It is recommended that each LFTC procure five four-student carrels such as those described in Appendix C. The units selected should incorporate the same functions but not necessarily the same equipments as those specifically described. If requested, NPRDC will assist in the selection of a specific carrel configuration and related mediating equipment.

It is also recommended that five additional tape recorders and a small audiotape duplicator be obtained. The recorders will serve as spares and will also be available for operation in conjunction with slide projectors in the classroom. The tape duplicators will provide convenient multiple duplication of audiotapes for student use.

Instructional Television

One of the most flexible communication systems recently employed for instructional mediation is instructional television (ITV). Applications range from complex, centrally controlled, closed circuit television (CCTV) systems to simple "back-pack" record/playback systems. Many approaches to the use of television were examined by NPRDC in connection with a related project sponsored by Headquarters, Marine Corps. It was found that ITV technology is still at an early point in its development and that complex ITV systems can rapidly become obsolete as new techniques and capabilities are introduced. Because of large-scale public application of television technology, however, developmental aspects of equipment design influencing monitor/system compatibility are fairly well fixed. Thus, an investment in high-quality TV monitors would be very appropriate at this time. On the other hand, procurement of a sophisticated central distribution and control system should await the evolution of more standardized system components and videotape coding methods. It is recommended that both LFTCs be provided with high-quality TV monitor equipment for each classroom and that cables be installed to take advantage of existing Navy television distribution equipment (located in the buildings at both LFTCs) for videotape playback. Should this not be feasible, it is recommended that inexpensive portable videotape recorder/playback (VTR) equipment be provided for use in each classroom. General specifications for classroom television equipment are provided in Appendix D.

Equipment will also be required for videotape preparation. In most civilian educational institutions, courseware (videotape, audiotape, etc.) is obtained primarily through centralized production facilities, although some of the more innovative schools rely more heavily on local production resources. Many civilian institutions and military schools with common subject matter can take advantage of the lower costs involved with centralized production methods. The LFTCs, however, are unique in that they address a specialized area of military operations and thus cannot take advantage of materials prepared by other commands. As a consequence, the LFTCs must have some capability for local or in-house courseware development.

Courseware development involves two major functions: (1) preparation of specifications and (2) production of materials such as slides, audiotapes, and videotapes. The first function, preparation of courseware specifications, was addressed previously. Courseware production therefore, is the problem to be covered at this point.

Both LFTCs have access to various production capabilities. Limited production of certain visual materials such as slides, viewgraphs, and posters can be accomplished by local on-base facilities. Procurement of the previously described tape recording equipment will provide the LFTCs with an adequate capability for low-cost production and duplication of audiotape materials.

Local capabilities for videotape production are available to both LFTCs. LFTCLANT can work through the Naval Instructional Television Detachment, Dam Neck, Virginia, and LFTCPAC through the Naval Instructional Technology Development Center, San Diego. Nevertheless, both commands should also be provided with limited in-house production capabilities to allow direct preparation of short TV presentations by individual instructors and taping of simple productions that do not require complex set, lighting, or direction. Recommendations for specific production equipment are contained in Appendix D.

Projectors and Screens

Classrooms at both LFTCs are quite large. Because of the distance from front to rear in many of these rooms, slide and movie projectors must be placed toward the front of the room between the rows of students. Projectors so placed are distractingly noisy and can obstruct the view of some students. It is recommended that high-power projectors which can project a bright image from the rear of the classroom and high quality screens which can be tilted to eliminate "keystoning" be procured for both LFTCs. Specifications for recommended projectors and screens are provided in Appendix E.

Calculators

Embarkation training courses at both LFTCs involve considerable arithmetic calculation by the student. Currently, electric adding machines are provided for classroom use, but nothing is available for convenient take-home use by students. Additionally, special arrangements must be made by embarkation course Mobile Training Teams for use of calculators. Miniaturized, battery-operated, digital calculators recently have become available at low cost. It is recommended that a calculator such as the Texas Instruments SR-10 be selected and procured for use in in-house and MTT embarkation training courses. Use of these devices should alleviate some of the problems associated with low arithmetic aptitudes among incoming students and may reduce requirements for remedial arithmetic training to some extent. It is also suggested that the LFTCs recommend that similar devices be made available to embarkation personnel for use on the job.

Ship Models

Visits and demonstrations aboard operational fleet units are highly desirable in the course of many landing force training programs. However, the difficulty and expense of providing such support have created a need for model ships for classroom and MTT instruction. A design and specifications for such models was prepared by NTEC at the request of LFTCPAC approximately 2 years ago (CO NAVTRA-EQUIPCEN ltr 623:RER of 7 Jul 1972), and a request was submitted to HQMC for funding to construct models for both LFTCs. This project should be assigned a high priority based on the requirement to provide simulated practical demonstrations to students. It is suggested that LFTCPAC reinitiate a request for the models and that a copy of the request be routed to LFTCLANT for endorsement.

TRAINING IMPLICATIONS OF AMPHIBIOUS FORCE AUTOMATION

New ships incorporating many automated support systems are currently being introduced into the amphibious forces. These new systems permit Force Commanders to monitor all aspects of amphibious landing operations and to exercise enhanced operational control by providing information that is more reliable and timely than ever before. It follows, however, that specialized training is required for personnel who will operate or use such systems.

Two levels of such training can readily be defined: (1) an operator level for system technicians who operate system input/output devices, and (2) a user level for decision makers who work with system output data such as summary reports or data displays. A third, less obvious, level of training is required to prepare Landing Force staff personnel to function as system coordinators, directing the collection and organization of input data and assisting in the processing and interpretation of system output data. The LFTCs currently provide some training with varying degrees of effectiveness. LFTCLANT has recently initiated coordinator training. In this report section, a brief review and discussion of training requirements for some specific systems and automated command and control systems in general are provided.

Mechanized Embarkation Data System

The Mechanized Embarkation Data System (MEDS) is a computer-supported system for compiling and processing embarkation data. The system is used before and during landing force embarkation to plan and control the landing of personnel, equipment, and supplies from amphibious force ships. During landing operations, the system provides information concerning the location of personnel, equipment, and supplies aboard ships and the status of unloading operations. Special operator-level training is not required for MEDS since the system uses standard Navy or Marine Corps computer support facilities.

The LFTCs currently provide both the user and coordinator levels of MEDS training in a relatively effective manner. It is felt, however, that course presentation could be enhanced through application of more advanced technology in two forms. A mediated presentation, possibly in sound/slide format, could provide an introductory overview of the preparation, processing, and use of MEDS data. This would allow students to understand the overall context of system use prior to learning the intricate details required for system application. Such presentations could be developed in-house, possibly as a reserve officer summer project. Another possible source of such support would be the Navy Instructional Technology Development Center or its detachments.

A second application of technology to MEDS training is related to preparation of MEDS data card decks for computer processing. In the course of such instruction, students compile and organize a MEDS data card deck for a hypothetical embarkation plan. As a performance test, a MEDS data card deck is processed to provide the student with MEDS data printout sheets. Excessive turn-around-time between submission of MEDS data card decks and the receipt of printout sheets by the student, currently as much as a week, is a handicap to the training process. This delay violates the concept of immediate feedback. It is felt that a MEDS data card processing system utilizing minicomputer technology could be developed at reasonable cost. Several characteristics of such a system as outlined by NTEC training equipment experts are discussed in Appendix F. Of all equipment recommendations discussed in this section, this should probably be assigned the lowest priority. However, in light of additional capabilities outlined by NTEC and the relatively low projected cost, it should not be dismissed altogether.

Amphibious Support Information System

The Amphibious Support Information System (ASIS) is a computer-based, fast-response, generalized storage and retrieval system. ASIS is currently employed in two forms: (1) as a portion of the Amphibious Flagship Data System (AFDS) aboard the USS MT WHITNEY (LCC-20) and the USS BLUE RIDGE (LCC-19) and (2) as a part of the Management Information System (MIS) being installed aboard the new LHA class ships. ASIS operation requires an entirely new training program.

Training for the AFDS form of ASIS is currently provided at the Fleet Combat Direction Systems Training Center, Pacific, (FCDSTCPAC); the Naval Amphibious School, Little Creek, Virginia; and the two LFTCs. FCDSTCPAC and the Naval Amphibious School provide operator and coordinator training and the LFTCs offer user-level training. Lack of equipment has created problems in both operator and user training programs. Only FCDSTCPAC has a complete suit of ASIS equipment for system function demonstration and "hands-on" operator training. There is no ASIS training equipment available in the Norfolk/Little Creek area, and the only operational equipment is located aboard the MT. WHITNEY. Because training visits to the MT. WHITNEY are difficult to arrange, "hands-on" experience for system operator trainees and limited system demonstrations are, in effect, precluded on the East Coast. This problem should receive immediate attention to facilitate adequate support of fleet training requirements.

The situation on the west coast is better in that operator and coordinator training at FCDSTCPAC, includes full access to the training system. Visits to FCDSTCPAC, for system demonstration can be arranged for user trainees at LFTCPAC. Since such visits are both time consuming and an administrative burden, however, some means of providing a limited demonstration of system capabilities of LFTCPAC would be useful.

Three approaches to solution of the east coast ASIS training problem were considered: (1) development of a complete ASIS trainer for installation at Little Creek, (2) installation of operational system terminal equipment at Little Creek with computer services provided through leased "long-haul" telephone lines to FCDSTC, Pacific, and (3) development of a special computer program to simulate ASIS functions on commercial terminal equipment supported on a time-share basis by an off-base computer system. A detailed discussion of the three alternatives as provided by NTEC is included in Appendix G.

The third alternative above, proposed by Colonel P. A. Cauchon of the Training Division of LFTCLANT, was selected by LFTCLANT for implementation on a trial basis. Funding was allocated from resources of this study to lease required terminal equipment and provide programmer support through June 1974. A summary report by LFTCLANT indicates considerable success in initial program development and application. If continued success is achieved, it is recommended that the program be expanded to support Navy Amphibious School ASIS operator training requirements. Additionally, it is recommended that LFTCPAC monitor this program and consider implementation of a similar system. If the program being developed for Little Creek can be adapted, costs of implementation should be relatively low, probably under $10,000 initially and $10,000 per year. Adaptation of the program itself, which is written in the BASIC computer language, should be a simple low-cost task.

Installation of simple ASIS simulation systems at both LFTCs would improve user-level training in the AFDS form of ASIS at relatively low cost. It is anticipated that minor system modifications will also allow simulation of the MIS form of ASIS. Information provided by the Fleet Marine Forces concerning ASIS training requirements is included in

Appendices H and I. The requirements are such that the minor investment required to provide a quality ASIS capability appears to be well warranted.

Automated Command Control Support System

A requirement always exists to train decision-makers in the tasks they must perform during actual operations. A coordinated amphibious assault is probably one of the most demanding, complex, and intense of all combat operations, yet present amphibious staff training still employs methods used during World War II. Planning procedures are taught and reinforced through paper-and-pencil exercises at the LFTCs. Annual large-scale (MAB size) landing exercises allow only one Amphibious Force and Landing Force staff team on each coast to receive some limited practical experience. Exercises of this nature are truly training exercises in that many participants have never performed their assigned functions during an actual landing operation. Thus, each landing exercise is conducted by novices and is characterized by a variety of problems stemming primarily from lack of experience.

The same problem could occur in other Navy operational areas were simulation systems not available as an alternative to actual full-scale exercises. Antisubmarine Warfare (ASW), Antiair Warfare (AAW) and Electronic Warfare (EW) trainers are currently in use to provide simulated operational training without taking ships and aircraft to sea. A similar capability is required for training Amphibious and Landing Force staffs. Such a system, referred to as the Amphibious Landing Force Command Control Simulator (AFCCS), is briefly discussed in Appendix J. It is highly recommended that a study be initiated to carefully assess the requirements for and feasibility of such a system and to identify training objectives and system functions in sufficient detail to permit decisions concerning system development.

CONCLUSIONS AND RECOMMENDATIONS

Specific recommendations concerning training methods, equipment and facilities are contained throughout this report. Highlights of the principal conclusions and recommendations are summarized below.

Conclusions

1. Recommendations derived from previous LFTCLANT studies and the current study provide sufficient guidance for a general training improvement program at both LFTCs. No further studies of this nature should be required until implementation of approved recommendations has commenced.

2. Learning abilities of future LFTC students, especially in enlisted grades, will be somewhat lower than the draft-motivated personnel of the Vietnam era. Decrement of arithmetic and reading skill levels will be the central problem. Additionally, students will demand more imaginative, mission-oriented training. Many methods which would resolve the above problems should prove effective in making training more efficient and interesting for higher aptitude students as well. Implementation of the systems approach to course design, as described in MCO 1510.23A, would be a major step toward development of the most effective course materials for training personnel with widely varying aptitude levels.

3. A major LFTC training requirement is to provide Mobile Training Teams (MTTs) to present instruction at locations throughout the Atlantic and Pacific areas. MTT instruction requires a major commitment of resources by the LFTCs and the commands receiving training. Use of the teams, however, allows a relatively small number of instructors to train a far greater number of students than would normally be practical. It may be possible to reduce the MTT costs through the use of alternative presentation formats such as programmed instruction or audiovisual presentations. Further study is necessary prior to a final decision regarding implementation of alternative formats.

4. Special instruction in the systems approach to course design should be provided to present and future LFTC instructors. Such orientation can best be effected for current personnel through a special familiarization program. Modification of the current LFTC instructor orientation and training programs will expand coverage to incoming personnel.

5. The LFTCs need to refurbish and, to some extent, re-equip their classroom facilities.

6. Automated support systems aboard new amphibious ships have created additional requirements for training of landing force personnel. Suitable means to demonstrate the operation and functioning of various systems are not available to the LFTCs, limiting their ability to provide adequate training in these areas. Computer system simulation technology could be effectively employed to resolve the immediate requirements for such training.

Recommendations

1. A systematic program to implement the recommendations of this report and of the earlier LFTCLANT studies should be initiated. No further comprehensive studies of methods and equipment should be conducted in the near future.

2. The systems approach to course design as outlined in MCO 1510.23A should be fully implemented by the LFTCs and support in the form of special instructor orientation, additional training equipment, and improved classroom facilities should be provided by appropriate agencies.

3. LFTC courses currently presented by Mobile Training Teams should be redesigned to take advantage of alternative formats such as programmed instruction and audiovisual presentation. The redesign should be based on conclusions of the MTT study project discussed previously.

4. A special orientation program should be initiated to familiarize current LFTC instructor personnel with the course design methods outlined in MCO P1510.23A. Instructional materials developed by the Marine Corps Instructor Training School should be used for orientation of new instructors, and one instructor from each LFTC should be sent each quarter to the Marine Corps Instructor Training School.

5. LFTCs should request funding to renovate and re-equip their classrooms in accordance with the specific recommendations provided in this report.

6. Funds should be requested for development of Mechanized Embarkation Data System and Amphibious Support Information System Simulators.

7. An in-depth study should be conducted to assess the requirements for and the feasibility of developing an Amphibious Force Command and Control Simulator for use in the joint training of Landing Force and Amphibious Force staff teams.

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APPENDIX A
SUMMARY OF PREVIOUS STUDY TOPICS

APPENDIX A
SUMMARY OF PREVIOUS STUDY TOPICS

Mission and Organization

Mission and Objectives

A brief analysis of the mission of LFTCLANT "to conduct training and instruction in the doctrine, tactics, and techniques of amphibious operations with emphasis on landing matters" was presented. The mission is derived from a Navy requirement established in DOD instruction 5100.1, outlining responsibility for training "all forces assigned to joint amphibious operations." Based on review of the mission and its implementation, it was recommended that an "updated version of the command's mission should be promulgated widely throughout LFTCLANT." It should be noted that the mission statement of LFTCPAC, while different in wording, is almost identical in purpose and goals. This topic was not considered pertinent for further analysis.

Service and Organization

This topic encompassed a review of service functions, records management, and organizational structure within LFTCLANT. Major conclusions were that service functions within LFTCLANT were performed in an excellent manner, formal guidelines for records management need to be developed, and reorientation of the organizational structure should be considered. Of these recommendations, one specific item, "assignment of an educational specialist," is considered especially pertinent to the current project. A suggested job description for this assignment is provided in Appendix B.

Academic Consideration

Educational Methodology

A reserve officer study group investigated the impact of educational changes and advances on future training at LFTCLANT. Topics addressed included: (1) the instructional process, (2) learning objectives, (3) instructional systems, and (4) education in the future. The major conclusions of this section are that (1) a true "systems approach" to education should be implemented at LFTCLANT, (2) in conjunction with the "systems approach", "measurable student performance" objectives should be developed along with course design, and (3) LFTCLANT instructors will assume the role of "learning facilitator" in the future. The "systems approach" topic is directly pertinent to the current study, and is discussed in depth.

Curriculum Analysis

This was a major appendix of the Schabacker report which addressed a number of topics including: (1) relevance of LFTCLANT course offerings to mission requirements, (2) projection of requirements for future courses, and (3) instructional methodology. Major conclusions were that (1) the majority of LFTCLANT courses fulfill legitimate mission-related requirements; (2) a continuing program of curriculum review will be required to insure that the latest changes in doctrine, tactics, and equipment are reflected in LFTCLANT course structure; and (3) both formal classes and those conducted by Mobile Training Teams are prepared and presented in an excellent manner. One subtopic in this section, the impact of Automated Data Processing systems, is directly applicable to the current study. A second topic, learning objectives, is also applicable.

Evaluation Procedures

Comments were provided on the administration of course evaluation questionnaires, student testing, and post-training follow-up questionnaires. Conclusions were that current procedures in use are effective, but that a method of obtaining post-training feedback 6 months or more after graduation would be useful. This topic was not considered appropriate for the current study. A report entitled *Procedures for Obtaining Training Feedback Relative to Electronics Maintenance* (Standlee, Bilinski, & Saylor, 1972), is recommended as a source document on training feedback.

Instructor Preparation

This section of the Schabacker report presents the results of a study of instructor training and orientation at LFTCLANT. It describes and evaluates the various instructor training methods employed and provides recommendations for continuing revision and modernization of the courses of instruction. This topic is considered pertinent to the current study.

Instructor and Staff Loads

A study of LFTCLANT staff workload provides statistical data concerning allocation of instructor time and the number of students attending various courses at LFTCLANT. This topic is not directly relevant to the current study.

Facilities and Equipment

The Learning Environment

Earlier studies which examined physical facilities at LFTCLANT are contained in various appendices of the Schabacker report. A review in connection with the Schabacker report concluded that (1) modernization of LFTCLANT classrooms is an urgent requirement, (2) "some provisions for a simulated model of shipboard facilities" is required, and (3) access to a time-shared computer facility with terminals at LFTCLANT is needed. A number of questions raised by these conclusions are discussed in detail.

Training Aids

Training aids were only briefly discussed in the Schabacker report and no major conclusions were drawn. However, recommendations are provided in the form of a proposed "multimedia center." Additionally, the report urged adoption of a "systems approach" to facilitate selection and application of media. It was also suggested that some findings of the CMC project, titled "Application of Innovative Training Support Systems," would be applicable to LFTCLANT training equipment requirements.

Library Resources

A brief audit of LFTCLANT library facilities conducted by the reserve study group concluded that the library used by LFTCLANT is an excellent resource suffering from lack of use. It was suggested that increased use of library facilities be considered during the curriculum planning process. Additionally, it was recommended that a publications review board, which last met in 1972, be reconvened on an annual basis. This topic was not addressed in the current study.

The Future

Impact of Technology

This section discusses the projected impact of Instructional Television, Computer-based Instruction, Automated Educational Management Systems, and automation in the amphibious forces. A number of questions raised in this section are considered in this report.

The Zero Draft Environment

This section evaluated the possible impact of an all-volunteer force structure on personnel and related training requirements at LFTCLANT. A number of questions also raised are answered in detail in the current study.

APPENDIX B
RECOMMENDED JOB DESCRIPTION FOR EDUCATION SPECIALIST

APPENDIX B

RECOMMENDED JOB DESCRIPTION FOR EDUCATIONAL SPECIALIST (GS-1710-11/12)

Introduction

This position is organizationally located in the Landing Force Training Command (LFTC), Atlantic/Pacific. The primary function of LFTC_____ is to provide training of Landing Force personnel in the doctrine, tactics, and techniques of amphibious operations. The primary functions of this position are (1) to serve as the Instructional Technology Expert in the application of instructional technology to the design or redesign of LFTC courses, and (2) to serve as a resource consultant on instructional methods and media in support of LFTC instructor personnel.

Major Duties and Responsibilities

Serves as a member of course design/redesign teams and participates in the (1) conduct of task analyses, (2) derivation of learning objectives, (3) selection of instructional media, (4) preparation of courseware specifications, and (5) conduct of course validations. Stays cognizant of the state-of-the art in instructional technology through the establishment of appropriate contacts in the research and development community, attendance at meetings and conventions of professional organizations, and review of relevant research literature and publications. Develops and refines procedures and methods for course design, development, and presentation based on advances in the state-of-the-art, changes in the doctrine or technology of amphibious warfare, and/or modification of LFTC mission requirements.

Functions as a media coordinator and specialist. Evaluates various mediating devices for use at the LFTC and makes recommendations for procurement and application. Coordinates the distribution, use, and maintenance of training equipment and the operation of a small training resource center. Coordinates courseware production by both in-house and external support capabilities as required.

Organizes and conducts local instructor orientation programs to supplement instructor training provided by other Navy or Marine Corps agencies. Provides information concerning specific LFTC training requirements and methods together with the latest applicable information concerning the use of instructional technology.

Performs limited administrative functions related to course design, development, production, and validation. Conducts briefings as required and effects liaison with personnel performing similar functions in other military and civilian organizations.

Controls Over the Position

The incumbent's immediate supervisor should be a senior officer in the LFTC instructional organization. It should probably be the Director of Training at LFTCLANT and the Director of the Staff Planning School at LFTCPAC. Much of the incumbent's work will be self-initiated through personal recognition of the challenges, problems, and requirements involved with instructional technology at the LFTCs.

Qualification Requirements of the Work

Requisite qualifications for this position are an advanced degree in Educational Psychology, in addition to specialized academic training in instructional technology. Previous military experience is desirable.

APPENDIX C
DESCRIPTION OF LEARNING CARRELS

APPENDIX C
DESCRIPTION OF LEARNING CARRELS

I. Description:

Four-position student carrel, each position equipped as follows:

A. Student position – (1) Howe CQ-DA, 4 each

B. Rear projection unit – Howe PM11

C. 35mm slide projector – Kodak Ektagraphic Model B-2

D. Student responder unit – Coxco Respondex, Model RB-305

E. Headphones – Avid Corp. Model H-88

*F. Synchronized cassette audio player – Avid Corp. Model 505LC

G. Chairs – Howe Model 106, forest green, 4 each

II. Specifications:

A. Carrel

1. Dimensions of each student position: 36" wide X 24" deep
2. Side panels 18" high extending 6" beyond desk surface
3. Eight-inch wide shelf located 12 1/4" above desk top
4. Desk top and shelf: 3/4" thick composition board surfaced with 1/6" off-white plastic laminate
5. Side and back panels: 3/4" plywood surfaced on both sides with 1/32" teak, textured, plastic laminate
6. Bumper molding: T-shaped, black vinyl to protect the edge of all horizontal and vertical panels
7. Legs: 1" square steel tubing equipped with adjustable glides and floor mounting plates
8. Aprons: Formed steel channel, allowing a student knee room of 24 1/4"
9. All metal parts finished in matte-black baked enamel
10. Overall dimensions: Approximately 74" wide X 60" deep X 47" high consisting of one (1) CQ-DS/one (1) CQ-DA
11. Light: 12" long, 8 watt, fluorescent light fixture. Prewired for easy installation and hook-up. Light fixture equipped with 110V outlet and on-off switch.
12. Power column: Aluminum, equipped with a 100V outlet located 2" above desk surface. All outlets 3-prong grounded type

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*It is suggested an alternative audiotape/projector sync. be substituted for the Avid equipment listed above if possible.

B. Rear-view projections modules: Model PM11

1. Dimensions overall: 35 1/4" long X 10 1/2" deep X 7" high
2. Construction: Hardwood plywood finished in black, textured enamel
3. Screen: 5 1/2" X 7" Polacoat screen located to the students' right at an angle of 20 degrees
4. Mirror: Single mirror located in an adjustable mount behind the screen
5. Hood: Light hood over screen to assure maximum image clarity
6. Mounting: Designed to mount on shelf in A(3) above and equipped to accept Kodak Carousel projector in C below

C. 35mm slide projector: Kodak Ektagraphic Model B-2 Catalog #AV313H or equivalent

D. Student responder: Coxco Respondex, Model RB-30S or equivalent

E. Headphones: Avid Corp., Model H-88 or equivalent

*F. Synchronized cassette audio unit: Avid Corp., Model 505LC or equivalent: flush mounted to students' left side of desk top

G. Chairs: Howe Model 106

1. Dimensions: 20 1/4" wide X 22" deep X 31 3/4" high
2. Construction: Molded fiberglass, one-piece seat and back
3. Leg: 7/8" square, steel tubing, black enamel finish
4. Feet: Self-leveling, rubber-cushioned, nickel-plated glides
5. Color: forest green

III. Maximum Bid Price Considered:

$1,550.00 each.

*It is suggested that an alternative audiotape/projector sync. be substituted for the Avid equipment listed above if possible.

APPENDIX D
RECOMMENDATIONS FOR TELEVISION EQUIPMENT

APPENDIX D
RECOMMENDATIONS FOR TELEVISION EQUIPMENT

Television Monitors

A large variety of television monitors, produced by a number of manufacturers, are suitable for use by the LFTCs. Consequently, only minimum specifications for monitor equipment are provided below and it is recommended that any model which meets the minimum specifications be selected for installation at both LFTCs. MCO 1500.29A provides detailed information of how to determine the optimum number and location of monitors for specific classroom configurations and should be used by the LFTCs in making such determinations.

Minimum Specifications for T.V. Monitors

Picture Tube	21" Color
Receiver	VHF, UHF, R.F. Closed Circuit Signals
Amplifier	4.5 Watt (min.)
Circuitry	100% Solid State
Cabinet	Any suitable material
Power	120V., 60 Hz

Video Tape Recorders and Players

If either LFTC is unable to arrange for the use of existing Navy television playback and distribution equipment as discussed, portable equipment should be obtained for use on an interim basis. Thus, it is recommended that three portable color videocassette players be procured for each LFTC for classroom use, and that one color videocassette recorder be procured for each LFTC to be used for videotape reproduction and duplication. Manufacturers descriptions of recommended equipment are provided below. Any similar equipment meeting these specifications could be substituted based on consideration of price and availability.

Sony Color Videocassette Player, Model VP-1000

Simple to operate. Fast automatic threading of tape. Only 4 major controls: PLAY, STOP, REWIND, FAST FORWARD. Tape counter for indexing tape.

Compatible with any conventional standard color or monochrome TV receiver. Simple installation with single cable connection to receiver.

Videocassette can be removed at any time without rewinding, reinserted later to proceed with program.

Two audio tracks provide high quality stereophonic sound or bi-lingual messages.

High resolution color or monochrome picture from advanced circuit design and Sony 3/4" chromium dioxide videotape. 3/4" tape provides optimum combination of picture stability and quality with slow-tape speed (3-3/4 ips) for tape economy, while allowing adequate space for two audio tracks.

Automatic shutoff on Rewind and Fast Forward. Skew and tracking controls for precision control of tape.

All solid state circuitry for long-term reliability with virtually no maintenance.

Full systems capability. Signals can be fed to conventional CCTV or video systems through direct video and audio outputs.

Multi-set hook-up possible. One Videocassette player can feed as many TV receivers as required with the use of optional accessories.

Weight 48 lbs.–8 oz.
Dimension (w) 19 5/16″ X (h) 8 1/8″ X (d) 18 3/16″

Price (based on GSA listing) $776.10

<u>Sony Color Videocassette Recorder, Model VO-1600</u>

Simple to operate. Fast, automatic threading of tape. Minimum number of controls. Tape counter for accurate indexing of tape. Automatic gain control for video and audio.

Built-in UHF/VHF tuner for off-the-air recording.

Audio dubbing capability for adding sound after video recording.

NTSC color record/playback capability. Single cable connection to any conventional color or monochrome TV receiver for playback.

Videocassette can be stopped and removed at any time without rewinding, reinserted later to resume recording or playback.

2 audio tracks provide high quality sterophonic sound or bi-lingual messages.

High resolution color or monochrome picture from advanced circuit design. Sony 3/4″ tape provides optimum combination of picture stability and quality with slow tape speed (3 3/4 ips) for tape economy, while allowing adequate space for two audio tracks.

All solid state circuitry for long-term reliability with virtually no maintenance.

Full systems capability. Signals can be recorded from or fed to conventional CCTV or video systems.

With an accessory distribution amplifier, one videocassette recorder can feed as many TV receivers as may be required.

Weight 59 lbs.–6 oz.
Dimensions (w) 24 3/16″ X (h) 8 1/8″ X (d) 18 3/16″

Price (based on GSA listing) $1,008.10

<u>Television Production Equipment</u>

Should it prove infeasible for the LFTCs to obtain television production support from local agencies, it is recommended that a limited production facility be installed at both

LFTCs. The system described below appears to be most suitable for support of current and projected LFTC production requirements:

International Video Corporation (IVC) Monochrome and Color Television Studio System (Colorcaster IV) consisting of the following:

IVC-870 Videotape Recorder

IVC-700C Videotape Recorder

  VTR Cabinet to match Control Console

IVC-40M-V Monochrome Camera with vidicon tube and viewfinder

  Zoom Lens

  50′ Camera Cable

  Tripod, dolly, cam head

IVC-92 Color Film Camera with vidicon tubes

  Internal Encoder

  Film Chain Lens

  Camera Control Unit

  Camera Junction Unit

  50′ Camera Cable

  CCU/Junction Control Cable

IVC-M-203 Optical Multiplexer

  Slide Projector

  16mm Film Projector with pedestal

  Light Control Unit

IVC-4800C Master Control Console with Switcher/Special Effects Unit

  Audio Mixer, 4 input

  Controls for two monochrome cameras

  Controls for one color camera

  Multiplexer and projector controls

  Preview, Line, and Input Picture Monitors with waveform sampler

  Intercom system

  EIA RS-170 Sync Generator

Audio Cartridge Recorder

Four-Unit Quartz Lighting Kit

Trinitron Color Monitor/Receiver

Video Routing Switcher

Set interconnecting Cables and Hardware

Price (GSA Contract #095-30393) $35,910

APPENDIX E
RECOMMENDATIONS FOR SLIDE PROJECTORS AND MOVIE SCREENS

APPENDIX E
RECOMMENDATIONS FOR SLIDE PROJECTORS AND MOVIE SCREENS

For normal use, the Kodak projection equipment currently in use at the LFTCs is entirely adequate. However, a number of the classrooms at both LFTCs are especially long, and special high-power projectors are required. Thus, it is recommended that the equipment described below, or equivalent, be procured in sufficient quantity to meet current operating and spares requirements.

DESCRIPTION:

Manufacturer:	Presentation Technical Aids, Inc.
Model:	'73 Highlight
Price:	\$645.00 including Kodak B or Model 800 slide projector
Projects:	2 X 2″ slides
Capacity:	80 – 140 slides
Operation:	Kodak remote-control cord, forward and reverse, focus input for high-intensity dissolve
Lamp:	PTA HL 1200 watt equivalent
Weight:	25 lbs.
Power:	120 V., 60 Hz
Other Models:	Highlight with Kodak Model AF, \$695.00; Highlight with Kodak Model RA 960 \$1,375.00
Notes:	Color temperature adjustable to 5400°K

It is recommended that the high-quality screens described below, or equivalent, be provided for all classrooms at both LFTCs.

BRANDONS INC

Model:	Raise-N-Tilt
Type:	Wall
Mounting:	Gliding "H" frame fastened to single arm mount bolt wall
Surface:	Two-way lenticular on matte white

Sizes and Prices:

Size	Std. Wall Mount	Corner Mount
50 X 50″	\$65.95	\$ 78.95
60 X 60″	80.95	94.95
60 X 70″	92.95	109.95

Other Models:	Mounting bracket for Kodak Ektalite projection screen BRT #567 deluxe, \$41.95
Notes:	Height and tilt can be changed independently.

BRANDONS INC

Model:	Roll-N-Tilt
Type:	Wall

Note: Fabric rolls up when not in use; tilting adjustment is infinite from vertical to 30°. Reflects maximum light to class as mirror would. Corner mount version allows the screen to swing from left to right.

Mounting: Spring roller with metal case, mounted on a single arm with tilt head assembly

Surface: Glass beaded, matte white, lenticular

Sizes and Prices:

Size	Std. Wall Mount	Corner Mount
50 X 50"	$ 72.95	$ 86.95
60 X 60"	89.95	104.95
70 X 70"	102.95	120.95

Note: Fabric rolls up when not in use; tilting adjustment is infinite from vertical to 30°. Reflects maximum light to class as mirror would. Corner mount version allows the screen to swing from left to right.

APPENDIX F
DESCRIPTION OF MEDS SYSTEM SIMULATOR

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DESCRIPTION OF MEDS SYSTEM SIMULATOR

A review of learning objectives for a typical MEDS course (e.g., G-8B/551/4407) was conducted at LFTCLANT. During classroom visits, it was observed that personnel were taught to (1) compile embarkation data for movement of troops, (2) operate the adding machine, (3) differentiate between various types of ships landing craft and landing force equipment, (4) complete the work sheets for the basic data deck used in MEDS, and (5) prepare the card input to the Mechanized Embarkation Data System.

Current MEDS training courses are well run and the trainees are highly motivated. The inability of the school to process the course final examination within a reasonable time is a handicap, however, and current MEDS training could be greatly enhanced through support from a minicomputer processor. A conceptual technical approach is contained in Figure 1. This approach may include a CRTT which, while not necessary to processing the MEDS deck and obtaining a printout, is suggested to permit inclusion of the Programmed Instruction portion of the LFTCLANT MEDS course 4407, to be offered as a computer-aided instruction (CAI) program. This addition would enable a trainee to use the console keyboard for responses instead of the printed sheet of the MEDS Programmed Instruction NO E-72.

In addition to automating much of the MEDS classroom instruction, it would aid trainees in evaluating their own progress while ensuring that they understand the system. Additional benefits would be expansion of LFTC statistical support activities such as classroom records, personnel management, typing, and record keeping.

Budgetary estimates are provided in Figure 1. It is estimated that the equipment represented would be at least 50% less costly if purchased commercially rather than through the military procurement process. No problem is foreseen in specifying that the equipment be portable for use by Mobile Training Teams.

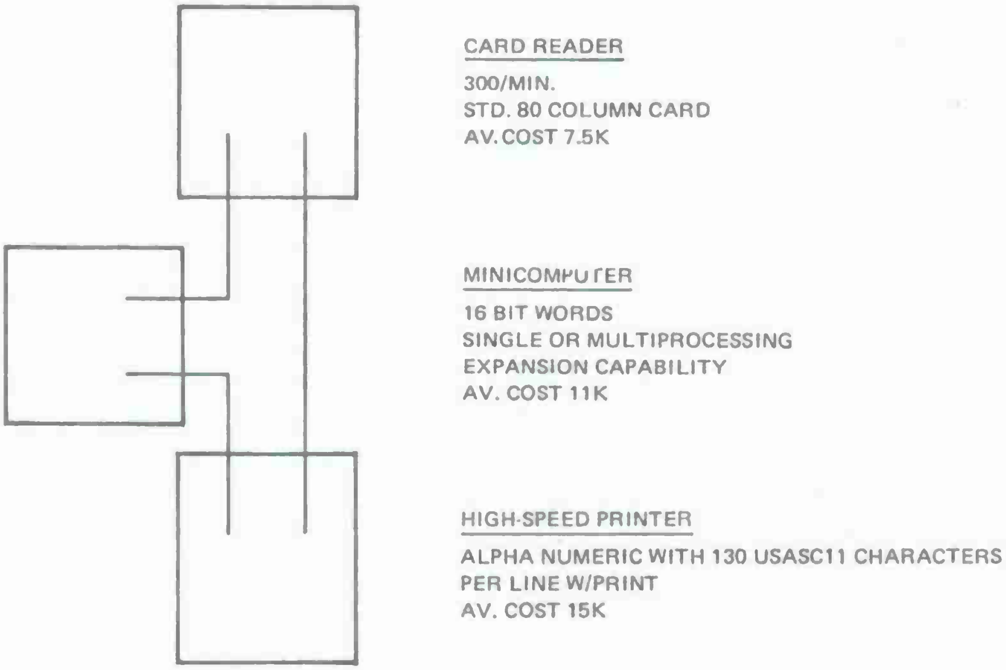

Figure 1. Mechanized embarkation data system.

Total cost for a completely compatible system with minimal interface costs could approximate 33.5K. Cost of an expansion capability for the computer could approximate 10K and of the software (programming), 35K.

Figure 1 is just one example of how MEDS training may be improved through the use of processing equipment. Several configurations are possible, depending upon the number of personnel to be trained and the requirement to provide an instructor station.

In order to develop a technical approach which would include engineering cost elements, a military training system characteristics document would have to be prepared by NTEC.

APPENDIX G
AMPHIBIOUS SUPPORT INFORMATION SYSTEM

APPENDIX G
AMPHIBIOUS SUPPORT INFORMATION SYSTEM (ASIS)

APPROACH

Introduction

ASIS is a newly-developed computerized system intended to provide rapid response to queries posed by the Landing Force Commander (LFC) during an amphibious assault. Responses are predicated on accurate and complete data files constructed in a manner to contain pertinent information that will enhance the decision-making capability of the LFC.

ASIS installations presently are aboard the USS BLUE RIDGE (LCC 19) and the USS MT WHITNEY (LCC 20) and at the Fleet Combat Direction System Support Activity (FCDSSA) at Point Loma. Courses in ASIS are given at LFTCLANT and LFTCPAC and, except for visits of opportunity to Amphibious Command ships and FCDSSA, no hands-on training is available. A conceptual approach utilizing simulated training equipment for ASIS training is described in Figure 2.

The User's Guide for ASIS published by the Headquarters, Marine Corps, provides a very detailed discussion and coverage of system operation and functions.

This description will provide a brief conceptual overview of an ASIS System Trainer. It should be emphasized initially that the functional capability of the proposed trainer will provide training in all ASIS functions using the QUEST computer language. In addition, the instructor will be provided the capability to modify the training in ways which cannot normally be achieved using the existing tactical hardware and software.

Throughout this discussion, "ASIS" will be used when referring to the overall functional and hardware system, and "QUEST," when referring to the computer language for that system.

ASIS Tactical Equipment and Software Discussion

The ASIS tactical equipment configuration (refer to User's Guide) has certain inherent limitations when used in a training or simulation mode. The more salient limitations are:

1. Computational capability of QUEST is inadequate for training purposes. There is no need for elaborate computations in the tactical application of QUEST. Computations required for training purposes would have to be added to the program.

2. Limited input-output (I/O) channels limit the ability to expand to provide multi-trainee stations.

3. No inherent ability to provide either a programmed or real-time instructor interface for trainee evaluation and response. Several capabilities and functions of the proposed instructor's station are listed below. Program routines do not exist for most of these functions in the ASIS tactical environment, and a significant programming effort is envisioned.

4. No ability to provide simulation of data base changes and/or modifications resulting from equipment degradation or malfunctions, battle damage, operator errors, and the like.

5. Limited availability of tactical equipment solely for high-cost classroom training purposes.

ASIS Training Functional Capabilities

A trainer concept is proposed for ASIS training to overcome the limitations previously noted and to provide significant improvements in training through simulation. The hardware configuration proposed will duplicate functional capabilities of the tactical system using a stored computer program at a considerably lower cost than that of the tactical hardware now in use. In addition, significant instructional features will be available with the trainer/simulator. These will be:

1. Computer-aided instruction (CAI) in ASIS data base preparation and management (including data base changes and updating).

2. CAI training in preparation of operations orders using simulated ASIS.

3. Training in CPX operations including all staff officer functions interfacing and interacting with ASIS.

4. Training in shifting from automated (ASIS) to manual (or semiautomatic) back-up operations to simulate battle damage.

5. Training in returning to ASIS from manual operations.

6. Training in recognizing system performance degradation and equipment malfunctions, and their impact on ASIS operations.

7. Enabling instructors to provide:

   a. Real-time control of all programmed instruction using CRTs for data entry (simulated UYA-5 functions, etc.).

   b. Real-time control of entire problem of data generation, entry, and retrieval.

   c. Real-time control of training in QUEST language, power formats, grammar, punctuation, and trainee interpretation of Guiding Error Messages (GEMs).

   d. Real-time evaluation of trainee progress for various levels of problem complexity.

   e. Real-time control of training problem complexity.

   f. Insertion of simulated hardware malfunctions. This capability alone is a major consideration in selecting a simulated system over the operational system for training. A study conducted by Dunlap and Associates in 1964 for BUPERS Personnel Research Division, Psychological Research Branch, titled "The Navy's Training Problem," indicates that not enough stress is placed on degraded system operation. The report states that during the stress produced by an equipment malfunction, operators tend to make inappropriate responses which may further damage the equipment. Further, serious drawbacks to an on-the-job training program that uses operational equipment are:

      (1) Lack of trained instructors, lesson plans, and training aids.

(2) Low priority for OJT.

(3) Inadequate classroom space.

(4) Reluctance of personnel to use operational gear for training.

8. Equipment configuration and simulated QUEST program permit addition of a reasonable number of identical trainee stations (simulated UYA-5's and simulated UGC-13's).

Proposed ASIS Trainer Configuration

Figure 2 depicts a generalized concept of the recommended hardware configuration. The equipment is state-of-the-art and, for the most part, commercially available. The trainee will be configured specifically to simulate ASIS-QUEST functional capabilities and to provide the additional training functions indicated previously. It is not proposed or anticipated that any tactical ASIS computer operating function training will be provided by this concept.

The trainer equipment of Figure 2 will be programmed to provide all ASIS functions through real-time simulation. QUEST-language operator-machine interface communication will be provided via a specially programmed version of QUEST.

As indicated in Figure 2, there is an instructor's station as well as five (5) trainee stations. The equipment at each trainee station will simulate all functional capabilities of the UYA-5 CRTT, and display data information for CAI. Commercially available ASR-35 teletype devices will provide all functions of the UGC-13 TTY, a much more cost effective approach for training.

The computer (commercially available with a real-time stored simulation program) will provide additional processing performance, high-speed memory, input/output and other data-handling capabilities required for the ASIS trainer/simulator. Mass storage will be on magnetic discs. Multiple data bases (for multiple trainee operations), CAI data pages, portions of the CAI executive routine, the complete main trainer real-time program, the daily readiness program, and system test and diagnostic programs will be stored on the disc. Any program can be immediately recalled in case of program errors or equipment malfunctions.

The primary simulator program input/output (I/O) medium will be magnetic tape. The magnetic tape units indicated in Figure 2 are commercially available units fully compatible with commercial standard and Federal Information Processing Standards (FIPS) requirements. Additional input-output media particularly for data I/O will be provided by standard 80-column punched cards and eight-level punched paper tape. Off-line card punches will provide instruction in the preparation of data cards for input to the ASIS system.

Real-Time ASIS Trainer Program

All trainer control and simulated ASIS functions will be generated by a stored program in the simulator computer. This program will be organized, designed, and implemented specifically for this trainer. The interface language to be used by the several trainees will be QUEST. The full capabilities of QUEST will be available in the trainer. However, the present QUEST object program cannot be used directly since additional simulation functions and other programmed controls must be provided explicitly for training requirements capabilities listed above. The difference in capabilities and instruction repertoires between the trainer equipment and the tactical ASIS equipment also precludes direct use of the existing QUEST object program.

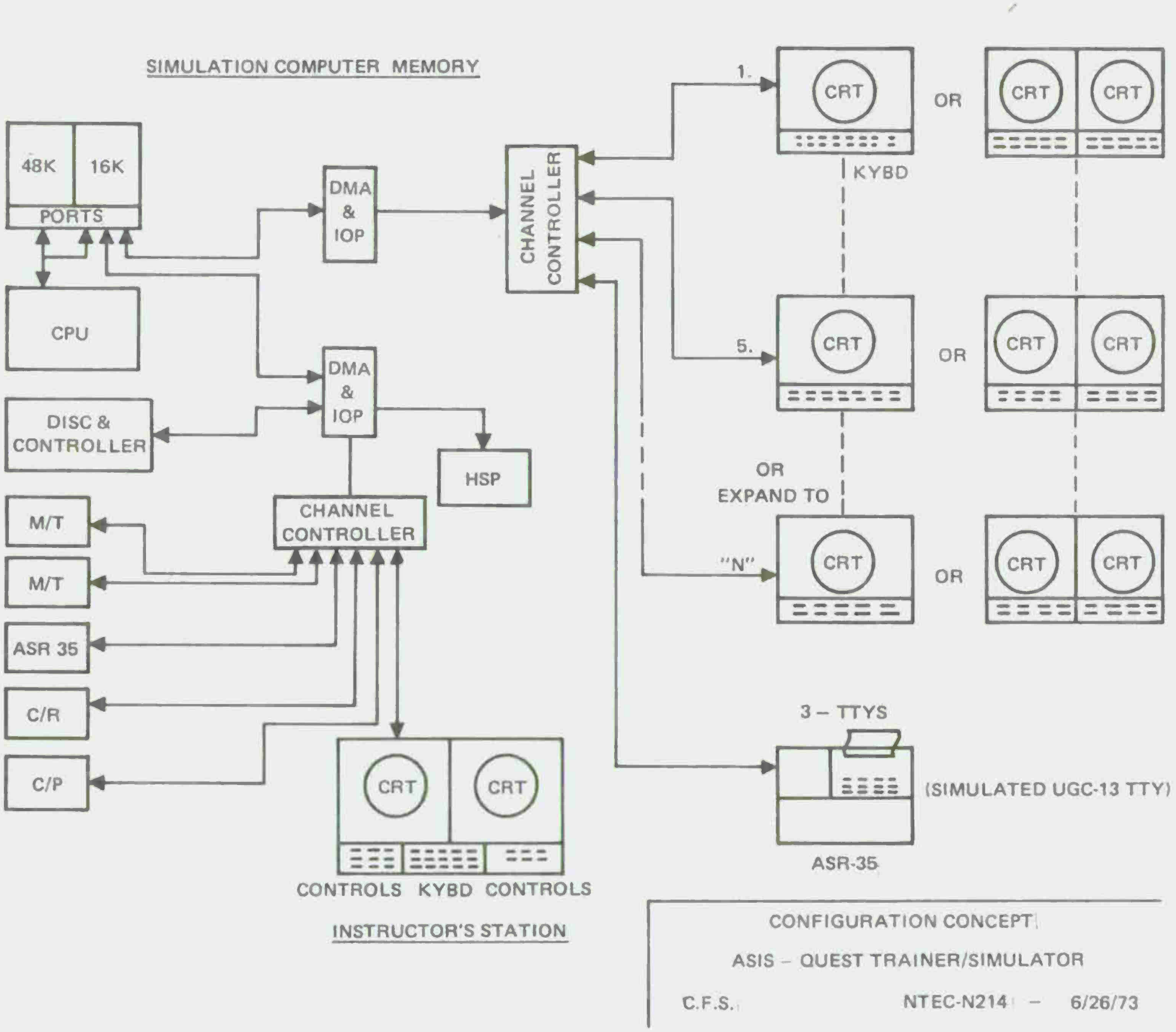

Figure 2. Proposed ASIS trainer configuration.

Figure 3 presents a basic concept of the overall real-time trainer program in modular form. The executive control routine will be organized in an open-ended fashion to permit installation of additional trainee stations (CRT's and TTY's) without re-programming the entire simulation program. To further aid in achieving this software concept, the entire trainer program will be designed, organized, logically partitioned, flow-charted, and coded as individual modular routines.

Instructor's Station

The instructor's station indicated on Figure 2 is the centralized trainer control facility. In addition to having all functions of a typical trainee station, special control features are provided. The following minimum capabilities and functions will be available to the instructor:

1. CRT functions, selectable for each trainee.
2. TTY functions, selectable for each trainee.
3. Control and display of all CAI functions, individually selectable for each trainee.
4. Ability to select or designate any available data, format, or other tabloid (alphanumeric) information for display at any trainee station.
5. Ability to freeze any one or all problems including activation and/or deactivation of all trainee stations.
6. Ability to reset any or all problem conditions.
7. Ability to immediately recall or report any or all problem conditions.
8. Ability to introduce selected or original data to any data base.
9. Ability to introduce simulated data errors and equipment malfunctions as well as simulated battle damage.
10. Ability to designate individual trainee performance criteria.
11. Ability to access and display any data, file parameter, or other information related to the ASIS system functions.
12. Ability to lock-out or release any data file or other data, tabloids, etc., from or to any designated trainee station.
13. Ability to communicate with each trainee station separately or on a party-line basis for verbal instructions, critiquing, conferences, or assistance during a training exercise.

As indicated above, the proposed system is flexible. The system will handle as many or more data files as the tactical ASIS.

Flexibility

The ASIS trainer/simulator will have significant flexibility in terms of operations, equipment configuration, and functional capabilities. A key facet of this concept is the ability to expand the basic system to provide additional training capability in a very cost-effective manner. Functional expansion will be achievable by enlarging or extending the various routines which comprise the real-time simulation program or by adding new routines. Additional trainees can be accommodated within a given class by installing additional trainee

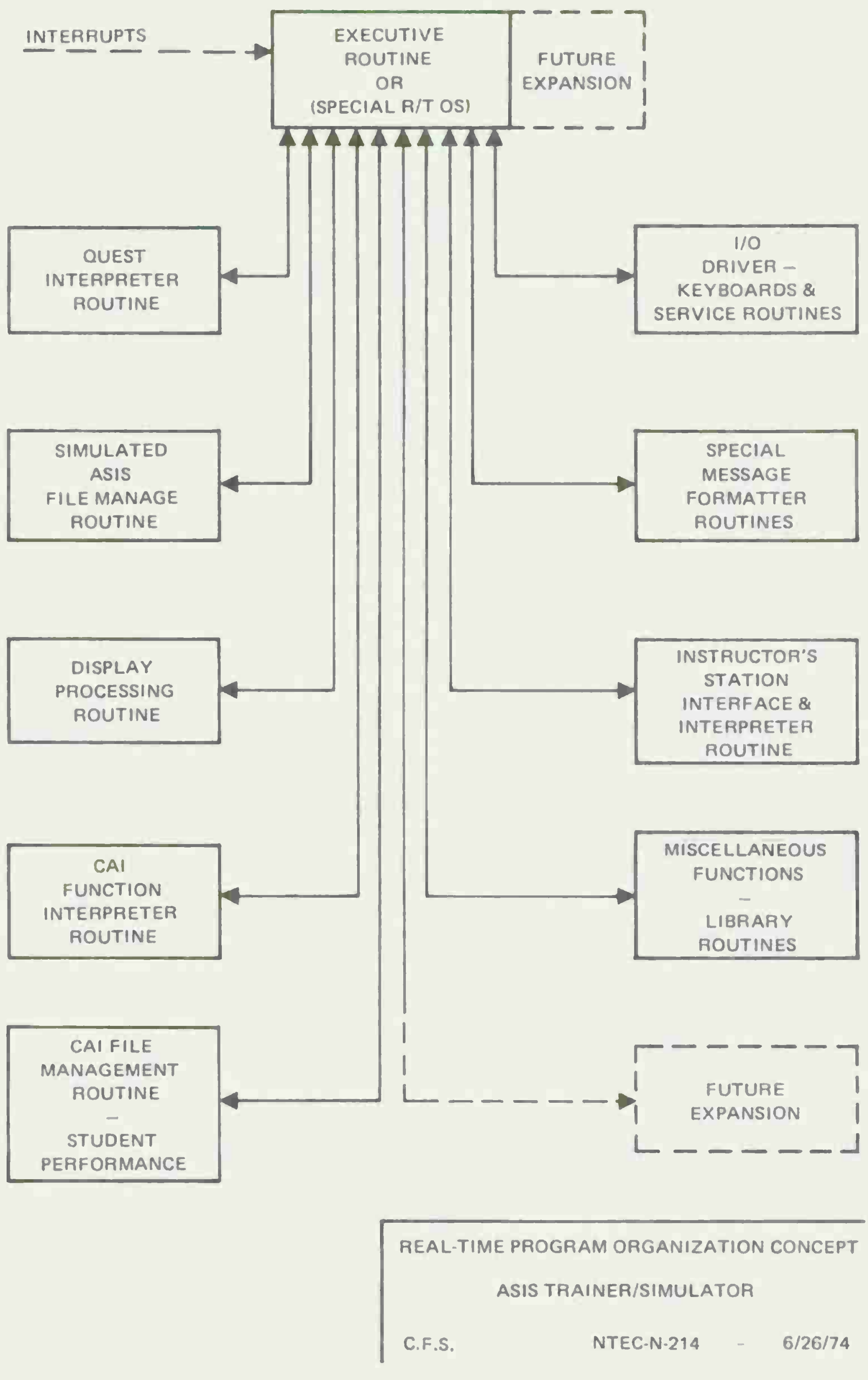

Figure 3. Overall real-time trainer program.

stations. It should be noted that none of the trainee stations will be specifically and/or permanently or functionally dedicated as in the real-world ASIS system (e.g., MILOPS, SACC, Flag and Intelligence). The instructor has the ability to make such designations during any training exercise as may be required.

The equipment configuration will have additional capabilities. The ability to expand high-speed core memory, add additional I/O channels, and provide inherently greater data handling and processing capabilities of the CPU are outstanding expansion features not possible or available in the tactical equipment now handling the ASIS system.

It is noted that ASIS terminals are not permanently dedicated except by virtue of location and any information can be displayed on any of the CRTT's. However, the tactical routines would have to be modified, at some cost, in order to accomplish significant training.

Equipment Considerations

Estimated costs for budget planning purposes for the minimum ASIS trainer/simulator configuration as indicated in Figure 2, including the real-time simulation and control program of Figure 3, may be obtained from NTEC. These figures include cost of a 1-year interim logistic support period of instructor and maintenance training. Not included are construction of any new building or renovation of existing facilities (air conditioning, power, special flooring, partitions, etc.).

While this report is not intended to recommend specific equipment, the following computers are typical of the type and size that would be adequate for the system described herein: (1) Varian Model 73 (16 bit), (2) DEC-PDP 11/45 (16 bit), and (3) Data Craft DC 6024/5 (24 bit).

ALTERNATE APPROACHES

Training devices described for ASIS and the Amphibious Command and Control System may be termed "simulation systems" because no operational equipment is used. Training in complex warfare systems can also be accomplished by the use of operational equipments that are stimulated to operate as they would in an operational situation. This stimulation approach is straightforward in concept but is surrounded by technical difficulties and limitations. In systems that are widely used and in which the number of components is sufficiently high to provide units for training, the limitations may not be severe. In newly developed systems such as ASIS, however, it is difficult to obtain and dedicate a complete system for training purposes alone.

Simulation equipment, in contrast, provides the kind of flexibility needed to train personnel in systems that are still under development. In the initial design of a simulated system, provisions can be made for all current and projected training requirements, an option not available with operational equipment. Further, the remarkable advances in computer technology over the past several years have multiplied the ability to simulate in detail the many complex mission elements characteristic of amphibious operations. The most significant new advances in the training field have been the improved and expanded provisions for scoring, monitoring, and automated teaching that can be incorporated into simulation systems. For these reasons, the complete simulation approach to ASIS and ACCS is recommended.

Alternate approaches to ASIS training were suggested at various activities visited during the study. While all were considered feasible, two are described here briefly.

ASIS Land-leased Line System

An approach to ASIS training at the Naval Amphibious School, Little Creek, Virginia, through the use of operational equipment stimulated by the computer complex at the Fleet Combat Direction System Support Activity, San Diego has been proposed (see Figure 4). Preliminary cost data for such a system using leased communication lines has been compiled by LCDR G. Giersch of the Naval Amphibious School. A detailed comparison of this approach with the simulation system previously described can be made only after the learning objectives for those courses to be supported by the training system are identified. This draft contains some comments on the scope of the effort.

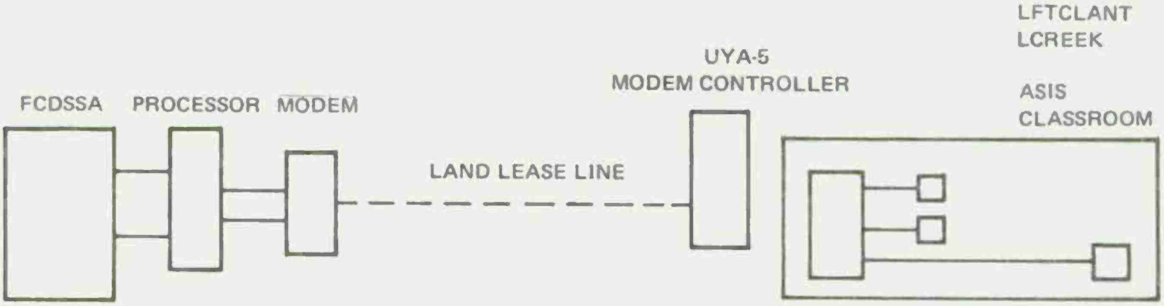

Figure 4. ASIS land-leased line system.

It has been established that dedicated computer time at FCDSSA San Diego can be made available for LFTCLANT at Little Creek. This would permit the use of the same tactical programs furnished to the operating forces and training could be realistic so far as equipment operation and types of learning exercises are concerned. The most obvious difficulty is that new operational equipments must be provided and a training system for this configuration designed for Little Creek. Cost considerations aside, the question still remains as to which operational ASIS configuration should be represented by the new trainer. The LCC and LHA systems are not compatible. However, a simulator could be designed to duplicate the functions of both systems.

Another consideration is that the computer program at FCDSSA will have to be modified to accept queries from Little Creek. The cost of changing the program will vary according to the equipment selected for Little Creek, but the operational system is not set up for this type of time-sharing at present.

The leased land-line system from Little Creek to San Diego would not be costly so far as special equipment at each terminal is concerned. However, the monthly cost to maintain the communication line is estimated at $1159, broken down as follows: telepax @.50/mile for 2319 miles = $1159. Additional costs are:

1. Equipment installation – $250
2. Telephone circuit monthly rate – $200
3. C-2 conditioning – $40

The cost to provide equipments necessary to conduct training at Little Creek that compares with that available at FCDSSA would be as follows:

1. Digital Computer – 642B – $165K
2. UY-4 PPI console – $54K
3. P-492 Power Unit – $14K
4. PT 490 Plotting Head – $14K
5. Tape Unit (DEHC) – $230K
6. RD – $80K

While the leased land-line approach to ASIS training is definitely feasible, it appears that the same objectives can be accomplished and a much more flexible training system developed with the use of a minicomputer at Little Creek to simulate all of the functions of the 642B at FCDSSA. A detailed technical analysis for this approach will have to be the result of a separate study because there are several ways to accomplish the task. For example, it may be feasible to use an AN/UYK-7 (LHA version) computer with its attached high-speed printer to meet enough of the training objectives to merit serious consideration (and also to provide MEDS training capability). Further, a statement of learning objectives is necessary to define the input-output requirements used to determine computer size and cost.

IGOR

With the excellent cooperation of Colonel Paul A. Cauchon, USMCR, at LFTCLANT Training Division, certain aspects of training have been identified as requiring computer support for effective implementation. An analysis of the nature of the training problem, which is unique to the Marine Corps, indicates that in order to provide data processing equipment orientation and limited hands-on training as part of the regular curriculum, the least costly approach (and one that would permit immediate initiation of training) would be to time-share an off-base computer system. Such a specific system has been found by Colonel Cauchon – the Hewlett Packard 200F Time-Share Computer System, known as IGOR, located at the Armed Forces Staff College in Norfolk. A brief description follows:

IGOR is designed to accommodate up to 32 users simultaneously, but now serves a maximum of 24 terminals, three of which will be lost after 1 January 1974. Hence, the addition of up to eight terminals at LFTC would require neither hardware modification nor scheduling coordination with AFSC. The system is available 23 hours per day (1 hour is used for batch processing of AFSC administrative card decks), 7 days a week. The 200F Time-Shared Basic language offers the power and flexibility of a high-level language ideal for the interactive mode of instructional programming. A file manipulation capability and a wide variety in input-output formatting make it suitable for simulating various information management systems. As in any time-shared system, the host (AFSC) provides maintenance. Costs of any upgrading of the system would be shared by all users.

The proposed LFTC-AFSC link is depicted in Figure 5.

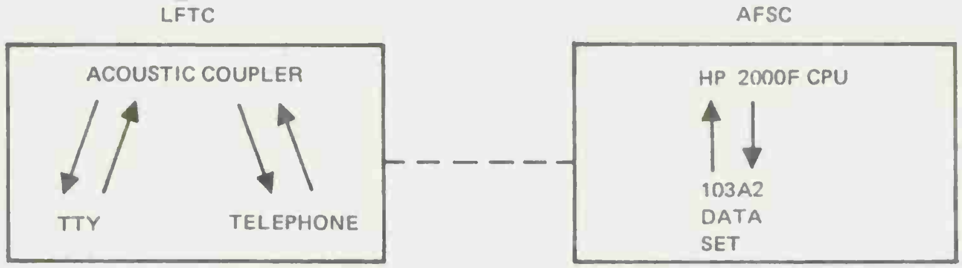

Figure 5. LFTC-AFSC link.

Initially, a movable terminal such as an ASR-33 teletypewriter (with paper tape) with acoustic coupler would be located within the LFTC training area. The acoustic coupler enables the teletypewriter (or any of several available types of terminals) to transmit and receive data over a normal voice telephone circuit. A data set installed at the Staff College completes the connection with the computer. Basic costs are as listed below:

Item	One Time Installation Cost	Monthly Lease Including Maintenance
TTY	$35.00	$ 45.00
Acoustic Coupler	–	9.00
103A2 Data Set	25.00	31.50
Centrex Line	20.00	15.00
	$80.00	$100.50

Hence, after initial payment of $80.00, fixed charges will amount to $100.50 per month. Computer time will be charged at approximately $7.00 per hour. Other input/output devices could be utilized, such as a CRT keyboard unit, a high-speed 130-column high-speed printer and a cassette tape unit. All listed equipment is currently provided and serviced in the Norfolk area by CARTERFONE, INC. ADP staff at AFSC and SACLANT, both of whom use several types of terminals from this source, attest to the quality and promptness of their service.

The approach described above has been funded for initial installation and monthly costs through June 1974. Immediate applications include:

1. Orient LFTC staff and students in fundamentals of computers and information management systems.

2. Provide modified ASIS simulation geared to the middle manager level (1st Lt./LTJG through LtCol/CDR).

3. Provide hands-on training through computer simulation, enabling students to input typical QUEST-type statements and immediately receive an appropriate response in logical format.

4. Translate requests from various staff sections into QUEST and interpret a variety of QUEST messages.

5. Illustrate the use of special command statements: SAVE, EXECUTE, RECALL, PERIODIC, CANCEL, etc.

6. Identify primary and secondary command statements and describe their interrelation.

7. Describe anticipated responses to common QUEST messages both in content and format.

8. Enlarge capabilities to establish, maintain, and interpret student data records, including a wide variety of daily, weekly, and monthly reports pertaining to the current operation of the Training Division. These records can be used for curriculum planning.

9. Conduct problem solving within courses, using airlift/sealift feasibility programs developed for use with Basic Joint Logistic Plans. Programs have also been prepared to aid staff planners in a limited war problem, computing force strengths, supply requirements, casualty estimates, and hospital requirements for three different courses of action. Up to 30 different options, with varying supply/casualty rates, may be used.

Hewlett-Packard provides a wide range of software library programs, but all the programs for the above described uses are generated in-house. FORTRAN and BASIC are the most commonly used programming languages.

An interesting approach taken by AFSC involved identifying incoming students who have data systems talents and employing them as assistants in programming and student orientation. This would seem to have definite application to LFTC, in that many of the Reserve Officer students who come through various Staff Planning courses during the summer have considerable computer experience.

After a few months with the IGOR, LFTC will explore ways in which computer support can improve effectiveness of instruction, specifically in the area of adapting existing programmed topics to CAI format. The system will also serve as a model for other information management system simulations using a unique program language slanted toward instructional purposes. Hence, its significance extends well beyond the immediate goal of ASIS orientation.

APPENDIX H
COMMANDING GENERAL, FLEET MARINE FORCE, ATLANTIC LETTER OF 5 SEPTEMBER 1973

APPENDIX H

80:CRP:rwh
5 Sep 1973

From: Commanding General, Fleet Marine Force, Atlantic
To: Commanding Officer, Naval Personnel and Training Research Laboratory, San Diego, California 92152

Subj: ASIS Training Requirements

Ref: (a) CO, NPTRL ltr 6303:aea MC LFTC 309 of 29 June 1973
(b) CMC ltr AYA-5:adb of 29 May 1973

1. In response to the request contained in reference (a), estimates of annual student input for the ASIS training courses listed in enclosure (1) to reference (b) are provided:

a. Integrated Data System Orientation

Headquarters, FMFLant	4
2d Marine Division, FMF	40
2d Marine Aircraft Wing, FMFLant	11
Force Troops, FMFLant	20
Total	75

b. ASIS Management Course

Headquarters, FMFLant	11
2d Marine Division, FMF	28
2d Marine Aircraft Wing, FMFLant	22
Force Troops, FMFLant	20
Total	81

c. ASIS Training Course

Headquarters, FMFLant	4
2d Marine Division, FMF	13
2d Marine Aircraft Wing, FMFLant	12
Force Troops, FMFLant	24
Total	53

2. It is estimated that similar student input will be required for the ASIS portion of MIS. Information available to this Headquarters concerning NIPS and the U-1500 simulator portions of MIS precludes the estimate of training requirements at this time.

APPENDIX I
COMMANDING GENERAL, FLEET MARINE FORCE, PACIFIC LETTER OF 8 AUGUST 1973

APPENDIX I

3/JWH/mho
1500
8 Aug 73

From: Commanding General, Fleet Marine Force, Pacific
To: Commanding Officer, Naval Personnel and Training Research Laboratory, San Diego, California 92152

Subj: Amphibious Support Information System (ASIS) Training Requirements

Ref: (a) CO, Nav Pers Trng Research Lab ltr, 6303:aea over MC LFTC, Ser: 309 of 29 Jun 73

1. In accordance with reference (a), the following yearly estimates of student input for each of the four levels of ASIS training are submitted:

	LCC-ASIS		LHA-ASIS
	Prior to LHA Crs	Subs to LHA Crs	
1 day Top Level	35	–	25*
2 week Coordinator/Supervisor	8	4	6
4 day Functional Management	125	–	85*
3 week Operator	18	18	24

*Subsequent to commencement of LHA-ASIS Training Program, the Top Level and Functional Management Orientation Courses should be able to be combined to cover both LHA and LCC systems, and because a base of ASIS familiarization will have already been established by the earlier LCC-ASIS training courses, quotas should also be able to be reduced for these levels.

2. Regarding NIPS training, the few Marine Corps personnel required to employ NIPS aboard amphibious ships are currently being trained at the NIPS Training Facility in Albany, Georgia, and it is anticipated that future needs can continue to be economically met by NIPSTRAFAC. The inclusion of a similar course at LFTCPAC appears unwarranted at this time.

3. Projecting requirements to support the U-1500 simulator of MIS, a brief course may be needed to facilitate transition of aviation files aboard LHA. It is anticipated that perhaps eight or ten personnel will require this orientation annually.

APPENDIX J
AMPHIBIOUS FORCE COMMAND CONTROL SIMULATOR

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AMPHIBIOUS COMMAND CONTROL SIMULATOR (ACCS)

A need always exists to train decision-making personnel in the tasks they must perform when engaged in a coordinated exercise such as an amphibious assault. Training at sea is valuable and necessary but, as noted in the introduction to this study, it is difficult to schedule in an austere funding climate. Also an instructor in an at-sea training exercise does not have control over the training situation nor can he modify the problem to match the skill level of the trainees. One of the most serious drawbacks to an actual operation is the inability to stop portions of the exercise without altering some or all of the tactical considerations. Because of this, the instructor or observer cannot demonstrate where different tactics might have been used to better advantage. Additionally, it is very difficult to maintain records that permit a meaningful critique.

In addition to the above, untoward weather conditions, such as fog, heavy seas, storms, etc., may make an operation hazardous. Further, a considerable amount of time can be used steaming to and from the operating area.

There is no question that actual experience at sea is the best way to qualify an individual in amphibious warfare. Many of the tactics and all of the communications necessary to an exercise, however, can be effectively and economically simulated ashore. Hence, an actual amphibious exercise can begin with units at a higher level of readiness.

The primary objective of an Amphibious Command Control Simulator (ACCS) would be to provide training in coordinated amphibious operations from a relatively simple MAU operation to a large-scale MAF exercise. The ACCS also could be utilized to conduct demonstrations and to evaluate tactics.

The capability to demonstrate all phases of amphibious operations is inherent in simulator design. School staff personnel will normally man the necessary command centers and follow controlled procedures. Displays for observation will be provided on the critique screens and in the command centers.

The capability to evaluate tactics is another inherent design feature of a simulator. When this is done, evaluation objectives replace training objectives and more experienced personnel perform the tactical operations on a repetitive basis, if needed to gather statistical data. An example of this capability exists at the Naval Amphibious School, Little Creek which has been designated as the Center of Excellence for naval gunfire support. Untested exercise plans can be executed and evaluated on the Supporting Arms Evaluator Device 16C53A before being taken to sea.

The utilization of an ACCS for demonstrations, coordinated training, and evaluation of tactics over a wide range of simple and complex tactical situations will require complete flexibility of control and operation. ACCS could be used in, but not limited to, the following:

Landing Force Planning

Organized Staff Landing Force Planning

Senior Landing Force Planning

Amphibious Orientation

Senior Officer Landing Force Orientation

Aviation Planning

Communications Planning

Shore Party Staff Planning

Tactical Air Coordination

The Command Control Simulator envisioned for the Amphibious Forces would not contain operational equipment found in the fleet except for minor equipments (e.g., DRTs, plotting boards, status boards, etc.). Because it is not intended to train equipment operators, it does not simulate equipment detail. Emphasis is placed on functional characteristics, in keeping with its primary mission as a coordinated tactics trainer. This design philosophy provides sufficient flexibility in the simulation system so that any existing or anticipated equipment capabilities can be readily synthesized. Differences in equipments aboard the LCC 19 and those proposed for the LHA have already been cited. The functional characteristics, however, are very similar. The following primary spaces, located in different places in the LCC 19 and LHA, can be simulated:

1. War Room/Flag Plot
2. Landing Force Operations Center
3. Supporting Arms Coordination Center
4. Helicopter Direction Center
5. CIC, Surface/Sub Operations
6. Air Operations (TACC)
7. Mil Ops, Ship/Shore Logistics

Goals are as follows:

1. To acquaint Navy and Landing Force Staff Officer personnel with the command control systems and facilities available aboard LCC and LHA-type ships.

2. To familiarize Navy and Landing Force Staff Officer personnel with the command control procedures and relationships employed aboard LCC and LHA-type ships during the assault phase of amphibious operations.

3. To allow Navy and Landing Force Staff personnel to experience integrated staff and command control system functioning prior to actual operational requirements.

Training Approaches are as follows:

1. Enable joint exercise of plans and alternatives in a simulated amphibious situation.

2. Provide Navy and Marine Corps Staff Officer personnel with realistic training, which elicits the type of integrated staff responses and actions normally possible only under actual operational conditions.

Instructor and critique areas and several ship command centers can be arranged to provide the most efficient use of space. In addition, a realistic shipboard atmosphere can be recreated.

Figure 6 outlines a recommended structure for an ACCS for the Amphibious Forces. The cost for a simulation system of the size and scope described briefly above can best be estimated by comparing it with previously developed tactical simulation systems. The simulator that most closely resembles the ACCS is the ASW Coordinated Tactics Trainer, Device

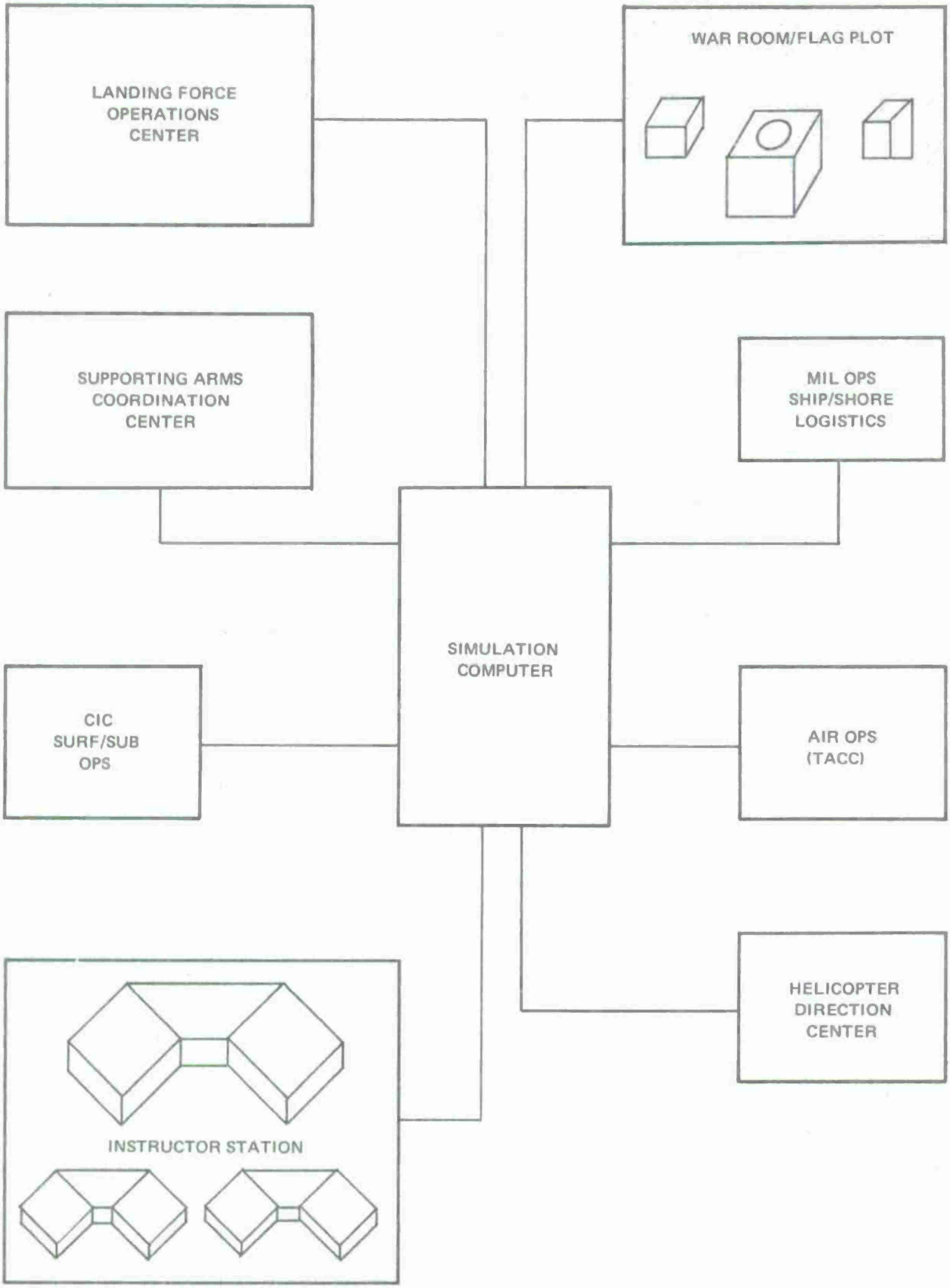

Figure 6. Amphibious command control simulator.

14A6. Such devices are located at Norfolk and the Fleet ASW School, San Diego. Contracts for these devices were signed in 1962 and 1964, respectively, and the devices were delivered in 1966. As listed in the last section of this study, Device 14A6 cost $8,493,500. Costs for the second unit, Device 14A6A, were similar.

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